

Type of work	Minimum percentage recommended on the work
Steel and iron manufacturing:	
Billet, blooming, sheet bar, slabs and slabbing mills	5
Boiler room, powerhouse, foundry and furnace rooms	5
Cold strip, pipe, rail, rod, tube, universal plate and wire drawing	10
Repair shops:	
Rough bench and machine work	10
Medium bench and machine work	30
Blacksmith shop	10
Carpenter and pattern shop	20
Storage	2
Store and stock rooms:	
Rough bulky material	5
Medium or fine material requiring care	10
Structural steel fabrication	10
Woodworking:	
Rough sawing and bench work	10
Sizing, planing, rough sanding, medium machine and bench work, gluing, veneering, cooperage	20

13.2 All lights should be provided with reflectors suitable for the type of work being done and meeting the requirements of wartime dim-out regulations. A regular schedule of cleaning and maintenance should be instituted that will keep the lighting units at their original efficiency.

#### 8-14. Hand Tools.

14.1 All tool rooms issuing hand tools such as hammers, sledges, chisels, spud wrenches, center punches, portable air-driven tools, portable electric tools and other tools should be inspected daily by a safety engineer to make certain that only tools in good condition are being issued. Tools in poor condition shall not be issued.

14.2 Workers' personal tool kits should be inspected at monthly intervals so defective tools may be discovered and repaired.

#### 8-15. Handling Material (Manual).

15.1 All employees should be instructed in the proper method of lifting. No limit can be set as to the maximum weight to be lifted by one man, but it should be made clear to all employees that they should secure help if the load is too heavy or too bulky for one man to handle easily. Mechanical equipment should always be used when it is available and its use is practicable.

15.11 Posters illustrating the proper method of lifting should be displayed frequently and men observed lifting incorrectly should be reinstructed by their supervisor.

#### 8-16. Machine Guarding.

16.1 All belts, pulleys, gears, chains, sprockets or other dangerous moving parts of machines shall be completely enclosed with guards

constructed of angle-iron brackets covered with heavy sheet metal or  $\frac{1}{4}$ -inch wire mesh. Vertical or inclined belts shall be guarded to a height of 8 feet above the floor. Horizontal belts over 8 feet above the floor may be guarded only on the under side. Gears, chains and sprockets should be guarded no matter where located.

16.11 Since metal may not be available for guards at present, substantially constructed wood guards will be acceptable.

16.12 In all cases where state requirements are more stringent than those given above, the state rulings must be followed.

16.2 All machines shall be guarded at the point of operation so employees will not be injured while operating the machine.

16.21 The standards of guarding for the various machines as recommended by the Insurance Rating Bureau should be followed except where state requirements are more stringent when the latter will take precedence.

#### 8-17. Staging and Ladders.

17.1 United States Navy—Maritime Standards of Construction for shipyard staging is in the process of development and will replace the present recommended practice when published.

17.2 All staging, scaffolding, platforms and walkways shall be constructed in accordance with the requirements of the California State Industrial Commission except where existing state codes are more stringent in which case the latter shall take precedence.

17.3 All ladders should conform to the American Standard Safety Code on ladders.



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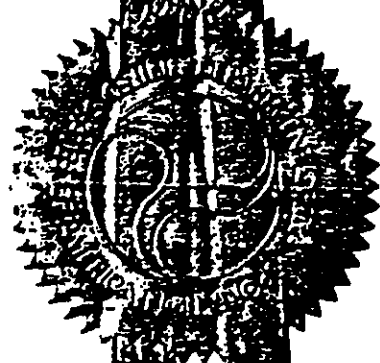
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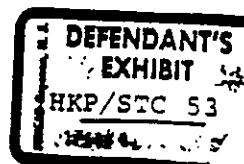
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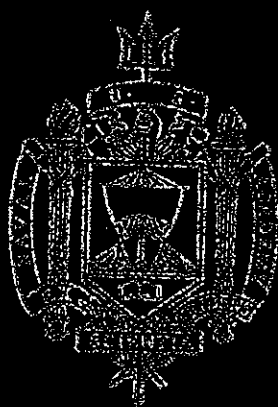
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# Exhibit 4

# THE HUMAN MACHINE

*Biological Science for the Armed Services*



ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND PUBLICATION

DEFENDENT'S  
EXHIBIT  
Buffalo Pumps

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# THE HUMAN MACHINE

*Biological Science for the Armed Services*

*By*

CHARLES W. SHILLING

*Captain, Medical Corps, United States Navy*



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## FOREWORD

IT IS A CURIOUS FACT about man, particularly the military man, that his knowledge of the physical world that surrounds him is always so much more highly developed and systematized than his knowledge of self. Why man should be so concerned with his physical environment to the frequent exclusion of a logical interest in himself, I do not know, but I am not given to arguing with observable facts.

It was in a discussion of this idea with Captain Shilling that I suggested we need not look further than the Naval Academy Yard for an illustration

of the point. We pride ourselves here at the Naval Academy on keeping abreast of developments in technical fields and on the techniques of teaching and learning. But in a basic subject like Hygiene we were depending on a textbook prepared before World War II. This new book, *The Human Machine*, is the result of that discussion.

Although this text was prepared to meet the specific needs of the Department of Hygiene at the United States Naval Academy, its value and usefulness to people of all the Services generally will be apparent.

C. TURNER JOY

*Vice Admiral, U. S. Navy*



## PREFACE

A LIMITED EDITION of this book was designed originally for the Hygiene Department of the United States Naval Academy as the basis for a course of instruction in biological science. The revised version in hand, however, was prepared to meet the needs of all nonmedical military personnel, and not merely the requirements of one particular group. The style of presentation has been kept informal, with a minimum of medical and technical terminology.

The text itself seeks to offer, in a simple and concise manner, information on the structure, function, and hygiene of the human body, in the belief that an understanding of man's physical being is essential to the process of self-assessment and personal adjustment in relation to the demands of military life. It should be pointed out, nevertheless, that if we are to recognize and interpret the complex patterns of human behavior in the military environment, there is need for a companion study on the human personality, since that material cannot be included in this text.

Considerable space has been allotted to the subject of group hygiene, preventive medicine, and sanitation. In a military organization, familiarity with these problems will help prepare the man in the Service for a higher degree of responsibility in his role as a leader. At all times, and under all conditions, health of the command remains of paramount importance.

In the complex functioning of our military organization, in peace and in war, the role of our medical personnel has increased steadily in scope. To traditional tasks, whole new areas of activity have been added—and ranking high among these, the study of the intricate, mutual relationships of man and machine. But still greater problems have risen to challenge us. Atomic, biological, and chemical warfare may present us with situations of as yet unexperienced environmental stress. If we, as military personnel, are to maintain a strong and resourceful posture in the face of these situations, our preparedness must be based upon firm knowledge and calm evaluation of their true nature.

CHARLES W. SHILLING

*Captain, Medical Corps, U. S. Navy*

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The Bureau of Medicine and Surgery, Navy Department, kindly granted permission for the utilization of illustrative material from chapters II and III of the *Handbook of the Hospital Corps*, United States Navy, 1953.

Permission was also granted by the U. S. Navy Electronics Laboratory, San Diego, California, for use of both textual and illustrative material from *Human Engineering Guide for Equipment De-*

*signers*, NE 1911303-3, February 1951.

In addition to these two organizations, it is a pleasure to thank the authors and publishers of those journals and books from which material has been taken with their permission. In each instance of quotation or reproduction of illustrations, specific credit is given.

Most of the original illustrations were made by Martin M. Amici, Hospital Corpsman Third Class, USN.

In addition to typing the manuscript, Madelaine C. Dobbins expeditiously accomplished the myriads of other tasks necessary for the completion of the text. This acknowledgment is but a poor recognition of the work that she did.

Commander John Paul Dickson, USNR, took an unusually active interest in the book and did a masterful job of editing it. He gave unstintingly of his time and ability, and his help and advice were invaluable.

My wife, Miriam Teed Shilling, has been an unfailing source of inspiration and assistance in the preparation of this text.

The opinions contained in this textbook are the private ones of the author and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

CHARLES W. SHILLING

## Chapter IX

# MALFUNCTION OF THE HUMAN MACHINE

THE HUMAN MACHINE is very wonderfully designed and fashioned to adjust itself to the environment and to continue to operate in a variety of situations. It has a very wide margin of safety, enabling it to carry on under peak load and under situations in which part of the system may be out of order. It has its own built-in defense against intrusion by various environmental factors, and its own repair system. However, despite all this, the human machine does break down and becomes, in the language of the doctor, "diseased."

That the problem of disease is important to the military man is self-evident. It is especially so if one knows anything about the history of mankind—and, particularly, the history of wars. Without going into great detail, it can be truthfully said that up until World War II almost all wars were decided by disease rather than by the might of one army over another. Even in World War II and in the Korean campaign, disease played a major role in various aspects of these actions.

In the wars in which our own country has been engaged, diseases have taken a toll of life greater than have the bullets of the enemy. In the Civil War the Confederate Army lost four times as many men from disease as from bodily injury. The Union Army suffered 114,759 battle deaths, but 233,789 deaths from disease. During the Spanish-American War there were only 349 battle deaths among our forces, compared with 4,795 from disease. The ratio of battle deaths to deaths from disease was about one to one in World War I, but largely due to progress in disease prevention the ratio changed to 13 to 1 in World War II.

Because of the relationship of disease to the winning of wars, it is extremely important that military personnel know the cause of these possible breakdowns in the operation of the human machine. No attempt whatsoever will be made to discuss or describe any disease. Such information is available in every library. No attempt will be made

to discuss the etiology of disease other than to briefly point out the various types of environmental conditions causing breakdown of the human machine. Also, nothing will be said in this chapter concerning the prevention of such breakdown, as this subject will be covered in the chapter on Preventive Medicine.

We shall now see what it is that causes the human machine to break down and to function either inefficiently or to cease to function at all. The discussion will be presented under the following headings: (1) physical trauma; (2) infectious disease; (3) venereal disease; (4) environmental injury; (5) nutritional disorders; (6) metabolic diseases; (7) degenerative diseases; and (8) mental derangement.

## 1. PHYSICAL TRAUMA.

Various types of accidents, acts of violence, and most war wounds fall under the heading of physical trauma. In other words, the human machine is forcibly disrupted by external mechanical force in such a way as to cause the breaking or tearing of some of its parts. Physical trauma includes: the cutting or tearing of the skin or muscles; the breaking of bones; the dislocation of joints; the rupture of internal organs; the crushing of the body; the penetration of vital organs, such as the heart and brain, by piercing objects or by bullets or pieces of shrapnel. Any of these quite obviously would disrupt the function of the human machine. If the disruption is of a vital organ or is sufficiently extensive, the machine, even with the assistance of the physician, may not be able to repair itself, and death will ensue.

Modern surgical procedures have progressed to the extent that if the casualty was still alive at the time of arrival of the first-aid man (usually within a few minutes after he was hit) his chances of ultimate survival were 97 out of 100 in the Korean War. This is a remarkable achievement and is due

## MALFUNCTION OF THE HUMAN MACHINE

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## 4. ENVIRONMENTAL INJURY

The human machine has a remarkable ability to adjust to its environment; however, occasionally it is overwhelmed by some extreme environmental situation, and as a consequence disease, injury, or death may result. Exposure to extremes of temperature causes most of the difficulties encountered by Service personnel.

The direct effect of extreme *cold* is the freezing of a part or of the entire human body. That this can easily happen is attested to by records of death occurring every winter right here in our own country, and it does not get as cold here as it does in some other places. The lowest recorded temperature on earth is  $-95^{\circ}$  F. reported in northern Siberia. There in the summer the heat goes to  $+90^{\circ}$  F. So the human machine must adjust or protect itself against an annual range of almost  $200^{\circ}$ . The coldest temperature reported in North America was  $-79^{\circ}$  F., observed at Fort Good Hope, 20 miles south of the Arctic Circle.

The indirect results of extreme cold are such conditions as frostbite, chilblain, and trench foot. Trench foot was an important cause of disability in both World Wars. In World War I there were 2,000 cases among American troops, and in World War II, during the invasion of Western Europe, there were 11,000 cases in the month of November of 1944. Immersion foot is a very common condition developing in almost everyone who spends time on a life raft with his feet in water.

Snow blindness and sunburn can both result from reflected light from the snow or ice.

It is apparent that to endure the extremes of cold, the human machine must be protected by heated buildings if it is to survive for any great length of time. It is possible to design clothing and protective masks, mittens, and shoes so that an individual can for hours withstand extremes of temperature that would otherwise freeze him within a few minutes. In general, clothing should be worn in several layers, rather than a single one, because air pockets are trapped between these layers. The outer garment should be windproof to prevent excessive heat loss from air movement. It should be water repellent, because wet clothing is a poor insulator. Loose-fitting garments are better than tight-fitting garments, because they entrap air and do not interfere with blood circulation. Leather mittens

lined with knitted wool are effective protectors of the hand.

During the Korean campaign the Navy developed an excellent cold weather boot which effectively prevented freezing of the feet. It is interesting to note that this boot, because it had an entrapped air-layer cushion, was also effective against injury of the feet from exploding land mines.

The direct and indirect effects of *heat* are localized injuries familiar to us as burns or scalds, or the general systemic effects of heat cramps, heat exhaustion, or sunstroke. All of these conditions are of importance to the Navy, because, despite everything that can be done, in the engine-rooms of our ships temperatures frequently rise to a level which may cause heat cramps or heat exhaustion. Numerous cases of sunstroke have occurred among our Marines who in their marches were exposed to the extreme heat of the sun. One of the secondary effects of heat that disturbs Service personnel greatly is what we call "prickly heat" or "heat rash." This was particularly serious in submarines prior to the installation of air conditioning, and, because of the constant nerve-racking irritation, resulted in lack of efficiency.

The environmental injuries due to changes in *air pressure* are discussed in the chapters on Aviation Medicine and Underwater Activity. However, these two chapters do not mention one environmental condition which troubles a person who first climbs a high mountain. At the higher altitudes there is a lower atmospheric pressure, with resulting oxygen deficit, which leads to anoxemia, known as "mountain sickness." Fortunately, the individual is able to become acclimated within a matter of a day or two, and there are no permanent effects.

Although *poisonous gases* are discussed in detail in the chapter dealing with Chemical Warfare, yet it is well to point out here that there are many industrial gases that also may cause disease and death. Carbon monoxide, methane, hydrogen sulfide, and chlorine are examples of industrial gases.

There are many *poisonous liquids* and *solids* which disrupt the internal mechanisms of the human machine. Among the most common of these are wood alcohol, sleeping tablets such as barbiturates, various acids and alkalies, and, of course, arsenic—famous as a means of poisoning.

There are also *dusts* and *vapors* which cause injury and occasionally death. For example, dust

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causes such diseases as silicosis, anthracosis, and other diseases due to the inhalation of such materials as asbestos dust, iron dust, tobacco dust, etc.

Beryllium poisoning has been a more or less recent industrial hazard and one that so far has baffled the medical profession. Beryllium at one time was used to coat the interior of all fluorescent lights. It is used by atomic energy workers at the present time, but it must be handled with great care, or injury and death will result.

No discussion of dust as a cause of injury would be complete without the mention of *smog*. Smog was forcibly brought to our attention by the catastrophe in the little Pennsylvania town of Donora and by the occurrence of a similar catastrophe on a much greater scale in London. The table below, recording registered deaths per million inhabitants in the administrative County of London, shows the severity of the 1952 situation compared to the cholera epidemic of 1866 and to the worst week of the 1918 flu epidemic.

Week of:	Deaths	Normal for period and season	Excess over normal
Aug. 4, 1866 (cholera) . . . . .	876	450	426
Dec. 20, 1873 (fog) . . . . .	713	470	243
Nov. 9, 1918 (influenza) . . . . .	1,085	300	785
Dec. 13, 1952 (fog) . . . . .	745	300	445

You can see why it has been said that the atmosphere is the world's greatest sewer. In spite of this, no difficulty apparently results except under certain meteorologic conditions when there is an atmosphere inversion, with no movement of the air away from the earth's surface, for long periods of time. Under these conditions, organic waste, coupled with high humidity and fog, leads to serious contamination of the air. Normal air pollution is a problem on which industry alone is spending an estimated \$120,000,000 a year for its control, and many cities have extensive campaigns to combat the problem. There are a number of people who feel that there is a direct relationship between the sharp rise in primary lung cancer and the rise in air pollution in all of our larger cities.

Lightning and man-made *electricity* are also the cause of disaster so far as the human machine is concerned. Closely allied to these are x-rays, radium, and the various by-products of splitting the atom,

such as gamma rays, and alpha and beta particles, and various radioactive isotopes. Much of this material will be covered in the section on Atomic Warfare.

This discussion of environmental injuries would not be complete without calling attention to the more violent attacks by nature in such manifestations as earthquakes, hurricanes, floods, and snowslides, which annually take a heavy toll on a world-wide basis.

## 5. NUTRITIONAL DISORDERS

The problem of nutrition has already been discussed in some detail in the section dealing with the human machine's equipment for energy production. However, it is here worthwhile to point out that at least two-thirds of the inhabitants of the world never have enough to eat and are therefore malnourished, with many facing starvation. The situation is getting worse all the time. Of the "Four Horsemen" of the Apocalypse, Famine should be the captain, for he weakens the body so that War, Greed, and Pestilence find a fertile field. It is hard for anyone in this country to realize it, but Herbert Hoover, following a recent survey, pointed out such marked food shortages in various parts of the globe that 800,000,000 persons are now faced with "the grimmest spectre of famine in all the history of the world."

Despite the fact that we live in a land of plenty, our food fads lead to a situation in which many people in this country become victims of malnutrition. Some of the diseases and nutritional disorders are such conditions as pernicious anemia, iron deficiency anemia, simple goiter, rickets, beriberi, pellagra, scurvy, and various other diseases resulting from lack of vitamins or proper nutrition.

Of all these, the one most important to the Navy is scurvy. In the early days of sailing ships, and prior to the discovery that ascorbic acid found in limes, lemons, and other citrus fruits prevented this ailment, the crew on a long voyage was sometimes so stricken that only a fraction of those who set out ever returned.

In this discussion of nutritional disorders we should not forget the fact that in this country there is more danger of becoming too fat due to overeating than there is in any other dietary or nutritional difficulty. Always remember, the best



## Chapter XX

# MILITARY MEDICAL ORGANIZATION

FROM EVEN a cursory review of this text it will be evident that the medical component of the military organization has a heavy responsibility, and that if it is properly organized and functioning, it is in a position to contribute greatly to the success of any and all military operations. This chapter is designed to furnish a brief review of pertinent facts concerning medical organization.

In the Department of Defense, there is an Assistant Secretary of Defense for health and medical affairs. There is a Medical Department in each of the three Services, headed by a Surgeon General who is a Medical Officer, usually of the rank of Major General in the Army and in the Air Force, and a Rear Admiral in the Navy. These medical departments contain personnel trained in medical, dental, and collateral sciences and have the facilities and administrative structure necessary to provide efficient medical and dental services at all levels in the military structure of the three Services.

The mission of the Medical Department of the Navy can be stated very briefly as: promotion of physical fitness; prevention and control of diseases and injuries; and treatment and care of the sick and injured. Obviously, in order to fulfill this responsibility the Medical Department is actively concerned with all phases of life in the Navy and advises all components of the Navy on matters which may affect the health and well-being of naval personnel.

The central administrative organization for the Navy\* Medical Department is the *Bureau of Medicine and Surgery*, which is headed by the Chief of the Bureau of Medicine and Surgery, a Rear Admiral, who is also the Navy Surgeon General; and

\* Note: No attempt will be made to discuss the medical departmental organization for either the Army or the Air Force; however, it may be stated that it closely parallels their military organization and is quite similar to that in the Navy. For further information concerning the organization and function of the Medical Department of the Navy, see the *Manual of the Medical Department*,<sup>5</sup> a copy of which is available in all medical activities.

a Deputy Chief of the Bureau, also of the rank of Rear Admiral. There are five assistant chiefs of the Bureau: one for personnel and professional operations; one for planning and logistics; one for aviation and operational medicine; one for research and military medical specialties; and one for dentistry. In addition, there are four divisions directly under the Deputy and Assistant Chief of the Bureau: the administrative division; the comptroller division; the medical statistics division; and the publication division. There is an Inspector of Naval Medical Activities and an Inspector of Naval Dental Activities. This is the administrative center for all of the medical activities of the Navy, but considerable authority is delegated to the field medical and dental representatives who serve on the staffs of the Fleet, Force, Naval Frontier, District, and River Commands.

Detailed information concerning operational components of the Medical Department is obviously not indicated in this discussion. However, every naval officer should at least be cognizant of the facilities of the Medical Department. These include numerous hospital and dental clinics located throughout the United States and at various overseas bases, operated under the command of a medical or dental officer; many dispensaries located in naval activities all over the United States which are operated under a Medical Officer-in-Charge; and hospital ships which are models of efficiency. In addition, there are sick bays manned by medical personnel in all of the units of our Fleet. All of the hospitals, dispensaries, and larger ships have dental officers as well as medical officers, and the dental service rendered even at sea is of the highest type obtainable anywhere.

There is a Medical School, a Dental School, and a Medical Research Institute located at the National Naval Medical Center, Bethesda, Maryland. There are also numerous other research units established in connection with operational activities throughout

the world. The functions and duties of the personnel of all of these activities are prescribed in great detail, but suffice it to say here that the Medical Department and all of its component parts are actively working with the operational forces of the Navy, in all areas of naval importance.

**Medical Department personnel.** All of the activities mentioned above are manned by Medical Department personnel who are organized into five separate corps composed of specialized personnel—Medical Corps, Dental Corps, Medical Service Corps, Nurse Corps, and Hospital Corps. In order that you may have some idea of the qualifications and background of the people you will be associated with in your naval career, we shall discuss very briefly certain facts concerning the personnel of these five corps.

*The Medical Corps* is composed of doctors of medicine who have graduated from an accredited medical school and have successfully completed an acceptable internship. These doctors come into the Navy in the rank of Lieutenant (junior grade). They are allowed three years constructive service credit for the four years of medical school and the one year internship which they have completed following the required four years of college.

Although it may be that some of the more junior doctors are not completely familiar with Navy tradition and custom, it can be safely assumed that with the training and experience as noted above they are well qualified to make medical decisions. The Navy has maintained a policy of sending its Medical Department personnel out for additional education, so that most of the doctors who head departments in our naval hospitals have had specialized training and are accredited by the American Medical Association in the specialties in which they are working. These specialists are just as capable in their field as are their brother specialists in civilian life.

*The Dental Corps* is composed of doctors of dental surgery who have graduated from accredited dental schools, many of whom have completed a year of dental internship. They, like the medical officers, enter the Navy as Lieutenants (junior grade) and are allowed three years constructive service. They also are given additional education and training, and a number are accredited by the American Dental Association in specialties of dentistry. Like the physicians of the Navy, they rank, professionally, with their brother practitioners in civil life.

*The Medical Service Corps* is composed of personnel trained in administration and supply, pharmacy, optometry, sciences allied to medicine, and any other such field as may be deemed necessary by the Secretary of the Navy. At the present time there are four main divisions of the Medical Service Corps: the Administrative and Supply, Pharmacy, Optometry, and the Medical Allied Sciences. As would be expected, these four divisions are staffed by: hospital corps personnel appointed as Ensigns in administration and supply; graduates of schools of pharmacy; individuals holding a baccalaureate degree in optometry; and scientists or research personnel who hold graduate degrees in such subjects as chemistry, physics, biology, physiology and so forth.

*The Nurse Corps.* The nurses of the Navy hold rank from Ensign through the rank of Captain and are all graduates of accredited schools of nursing, many of which now require a college degree in addition to the nursing training. Nurses serve most efficiently in all of our hospitals, in most of the dispensaries, and in our hospital ships and military sea transport ships, but not in other ships of the Navy.

*The Hospital Corps* of the Navy has a long and very enviable record of outstanding service. In 1814 there was a "loblolly boy" who assisted the surgeon. Later he became the surgeon's steward. The Hospital Corps as such was officially organized in 1898. One cannot praise too highly the work of this group. As a matter of fact, the commendation written by the Honorable James Forrestal when he was Secretary of the Navy should be read by "all hands" in its entirety. I quote here a few sentences: "You Corpsmen performed fox-hole surgery while shell fragments clipped your clothing, shattered the plasma bottles from which you poured new life into the wounded, and snipers' bullets were aimed at the brassards on your arms. On Iwo Jima, for example, the percentage of casualties among your Corps was greater than the proportion of losses among the Marines. Whatever their duty, wherever they were, the men and women of the Hospital Corps served the Navy and served humanity, with exemplary courage, sagacity and effort. Out of every 100 men of the United States Navy and Marine Corps who were wounded in World War II, 97 recovered. That is a record not equaled anywhere, anytime. Every individual who was thus saved from death, owes an everlasting debt to the Navy's Hospital Corps. No wonder men and women are proud

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to wear the emblem of the Hospital Corps!"

In the interest of knowing the various specialties of the men with whom you will be working, the following is quoted from the *Manual of the Medical Department*,<sup>5</sup> Chapter 9, paragraph 3, Enlisted Rating and Warrant Structure:

"The Hospital Corps is composed of enlisted rates and ratings and warrant officers and commissioned warrant officers, divided into four groups which are classified by the Bureau of Naval Personnel as Hospital Corps, Group X, Medical; Hospital Corps, Group XI, Dental; Warrant Officers, Hospital Corps, and Commissioned Warrant Officers, Hospital Corps, 817; and Warrant Officers, Hospital Corps and Commissioned Warrant Officers, Hospital Corps, 818. The following are the Group X rates: hospital recruit, hospital apprentice; hospitalman; hospital corpsman, third class; hospital corpsman, second class; hospital corpsman, first class; and chief hospital corpsman. These rates lead to Warrant Officer, Hospital Corps; 817. The following are the Group XI rates: dental recruit, dental apprentice; dentalman; dental technician, third class; dental technician, second class; dental technician, first class; and chief dental technician. These rates lead to Warrant Officer, Hospital Corps, 818."

**Research.** As it is with other components of the Navy, research is an intimate part of the Medical Department activity, the importance of which cannot be overemphasized. Through research we assist in the development of new equipment, new and better methods of care and treatment of various diseases and injuries; help in the problem of adjustment of naval personnel to all of the new and strange environmental situations in which they are placed; and, in general, provide the knowledge necessary for the more efficient operation of the Navy.

Research under the cognizance of the Bureau of Medicine and Surgery is accomplished in a large medical research institute, in several research laboratories, fleet and shore-based units, and in various naval hospitals. The scope of this research is extremely broad and parallels the total activity of the Navy.

**The Line-Staff Corps Officer relationship.** In your future position as Division Officers, and particularly

as Executive and Commanding Officers of Ships and Stations, it is imperative that you have a clear understanding of your relationship to your Staff Officers. It is also extremely important for a happy, well-operated, and efficiently functioning command that your relationship with your Staff Officers be a smooth and, if possible, amicable one.

It is well understood by all officers, both Line and Staff alike, that the function of Line command is solely the prerogative of the Line Officer. The duties of the Line Officer and of the Staff Corps Officer are all very carefully detailed by the Navy Department and by the various Bureaus so that no difficulty should arise due to any misunderstanding resulting from failure to *know* what should be done.

Most of the misunderstandings which all of us have seen from time to time in the Service are the result of clashing personalities or of the assumption of command prerogatives which are unwarranted. It is understood and fully appreciated that the Commanding Officer can issue orders to any officers within his command. However, he would be well advised to refrain from issuing orders in technical fields without the advice and concurrence of his specialists. The reason for having physicians, dentists, supply officers, paymasters, chaplains, and others, is for the specialist service which they can render to the Navy, and incidentally to the Commanding Officer in the operation of his ship; and there must be a compelling reason in order to justify overruling their judgment in a professional matter.

On the other hand, for the Staff Corps Officer to make any attempt to assume Line command functions, or even to presume to give advice in this area, is completely "out of line."

As prospective Commanding Officers, it is wise for you to remember that the prerogative of command does not necessarily mean that you have to have the answers to everything in your own head. No one in our present-day, complex Navy expects it. The Commanding Officer is not only a more efficient, but a bigger and better naval officer if he listens to professional advice in the areas in which he obviously cannot be competent.



## BIBLIOGRAPHY

1. SCOTT, K. Frances. *A College Course in Hygiene*. New York, The Macmillan Co., 1939 (1947 rev.) 202 pp.
2. GERARD, Ralph W. *Unresting Cells*. New York, Harper & Bros., 1940 (reissued, 1949), xv, 439 pp.
3. U. S. NAVY. Bureau of Medicine and Surgery. *Handbook of the Hospital Corps*. NavMed P-5004, Washington, D.C., Govt. Print. Off., 1953, xi, 692 pp.
4. FENN, Wallace O. Acute and Sustained High Energy Output. *Symposium on Stress*. Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D.C., 16-18 March, 1953, 8-17.
5. U. S. NAVY. Bureau of Medicine and Surgery. *Manual of the Medical Department, United States Navy*. NavMed P-117, Washington, D.C., Govt. Print. Off., 1952.
6. GELDARD, Frank A. *The Human Senses*. New York, John Wiley & Sons, Inc., 1953, x, 365 pp.
7. STEVENS, S. S. Machines Cannot Fight Alone. *American Scientist*, 1946, 34: 389-400.
8. WOODSON, W. E. *Human Engineering Guide For Equipment Designers*. NE 121303-3, Problem NEL 3Bla, U. S. Navy Electronics Laboratory, San Diego, February, 1951.
9. GUYON, Rene. *The Ethics of Sexual Acts*. Garden City, Blue Ribbon Books, 1941, xxii, 383 pp. (Translated from the French by J. S. and Ingeborg Flugel.)
10. KINSEY, Alfred C., POMEROY, Wardell B., and MARTIN, Clyde E. *Sexual Behavior in the Human Male*. Philadelphia, W. B. Saunders Co., 1948, xv, 804 pp.
11. WIENER, Norbert. *Cybernetics*. New York, John Wiley & Sons, Inc., 1948, 194 pp.
12. WIENER, Norbert. *The Human Use of Human Beings*. Boston, Houghton Mifflin Co., 1950, 241 pp.
13. ADAMS, Sidney, BUEL, Jack, BARCLAY, Gordon, and McDOWELL, Percival Eaton. *Report of Working Group on Human Behavior Under Conditions of Military Service*. Washington, D.C., Govt. Print. Off., 1951, xii, 426 pp.
14. SHELTON, William H., STEVENS, S. S., and TUCKER, W. B. *Varieties of Human Physique*. New York, Harper Bros., 1940, 347 pp.
15. TUFTS COLLEGE Institute for Applied Experimental Psychology. *Handbook of Human Engineering Data for Design Engineers*. Tech. Report SDC 199-1-1. OFFICE OF NAVAL RESEARCH, Special Devices Center, NavExos P-643, Project Designation NR-783-001, Dept. of the Navy, Washington, D.C., 1949.
16. CHAPANIS, Alphonse, GARNER, W. R., and MORGAN, C. T. *Applied Experimental Psychology*. New York, John Wiley & Sons, Inc., 1949, xiv, 434 pp.
17. SEVERINGHAUS, Aura E. Expanding Horizons in Medical Education. *J. Amer. Med. Assn.*, 1954, 155: 417-421.
18. U. S. NAVY. General Orders. *The Repression of Prostitution and Control of Venereal Disease*. Washington, D.C. Order No. 18, 1948, 2 pp.
19. U. S. NAVY. *Instructor's Guide for Presenting Sex Hygiene and Venereal Disease Facts*. NavMed P-5007, Washington, D.C., 9 pp.
20. U. S. NAVY. *Venereal Disease Control*. SecNav Instruction 6222.1, Washington, D.C., 1953.
21. U. S. NAVY. Bureau of Medicine and Surgery. *Manual of the Medical Department, United States Navy*. Chapter 3, Educational Measures. Washington, D.C., Govt. Print. Off., 1952.
22. U. S. NAVY. Bureau of Naval Personnel. *BuPers Instruction 1743.2, Protection of Moral Standards*. Washington, D.C. Govt. Print. Off., 1953.
23. PEARL, Raymond. The Search for Longevity. *Scientific Monthly*, May 1938, 462-483.
24. SMILEY, Dean Franklin, and GOULD, Adrian Gordon. *Your Health*. New York, The Macmillan Co., 1951, xi, 535 pp.
25. PEARL, Raymond. Tobacco Smoking and Longevity. *Science*, 1938, 87: 216-217.
26. HAMMOND, E. Cuyler and HORN, Daniel. The Relationship Between Human Smoking Habits and Death Rates. *J. of Amer. Med. Assn.* August 7, 1954, 155: 1316-1328.
27. STILES, William W. *Individual and Community Health*. New York, The Blakiston Co., 1953, ix, 492 pp.
28. BUREAU OF NAVAL PERSONNEL. *Human Behavior and Leadership*. NavPers 10058, Washington, D.C., Govt. Print. Off., 1949, 112 pp.
29. SUPERINTENDENT, U. S. NAVAL ACADEMY. *Naval Leadership*. Annapolis, U. S. Naval Institute, 1949, vii, 324 pp.
30. DEPARTMENT OF TACTICS. *Military Personnel Management*. West Point, Office of Military Psychology and Leadership, U. S. Military Academy, 1953.
31. DEPARTMENT OF TACTICS. *Principles and Techniques of Leadership*. West Point, Office of Military Psychology and Leadership, U. S. Military Academy, 1953.
32. CARNEGIE, Dale. *How to Stop Worrying and Start Living*. New York, Simon and Schuster, Inc., 1948, xv, 306 pp.
33. FOSDICK, L. S., LUDWICK, W. E., and SCHANTZ, C. W. The Absorption of Enzyme Inhibitors and Antibiotics in Dental Plaques. *J. of the Amer. Dental Assn.*, 1951, 43: 26-28.
34. MASSLER, M. *Your Guide to Dental Health*. Chicago, American Dental Assn., 1950. (Pamphlet)
35. MILLER, Samuel Charles. *Textbook of Periodontia*. Philadelphia, Blakiston & Sons, Inc., 1943, 2nd edition, xvi, 733 pp.
36. THOMA, KURT H. *Oral and Dental Diagnosis*. Philadelphia, W. B. Saunders Co., 1949, 3rd edition, xxi, 563 pp.
37. FOSDICK, L. S., LUDWICK, W. E., and SCHANTZ, C. W. The Effects of Dentrifices on Lactobacillus Counts: Antibiotics and Enzyme Inhibitors. *J. of Amer. Dental Assn.*, 1951, 43: 285-289.
38. RAPER, H. R. *How to Prevent Toothache*. Reprint from "Hygeia" (pamphlet). Rochester, Eastman Kodak Co., 1953.
39. EHLERS, Victor and STEEL, Ernest W. *Municipal and Rural Sanitation*. New York, McGraw, Hill & Co., 1950, xi, 549 pp.
40. WALTON, Graham. *Institutional Sanitation*. Washington, D.C., U. S. Public Health Service, Department of Justice, 1950, viii, 471 pp.
41. U. S. NAVY. *Manual of Naval Hygiene and Sanitation*, Vol. 1. NavMed P-126, Washington, D.C., Rev. 1949.
42. U. S. NAVY. *Manual of Naval Preventive Medicine*. NavMed P-5010, Washington, D.C.
43. FAIR, Gordon M. The Role of Engineering. *Public Health Reports*, July 1954, 69: 631.

## THE HUMAN MACHINE

44. U. S. ARMY. *Military Sanitation*. War Department Field Manual, FM 21-10, July 1945, iv, 249 pp.
45. U. S. NAVY. *Bureau of Ships Manual*. Chap. 58, Distilling Plants; Chap. 82, Boats and Life Boats; Chap. 36, Sanitation; Chap. 38, Ventilation and Heating. NavShips 250-000, Washington, D.C., Dept. of the Navy.
46. U. S. NAVY, Operational Development Force. *Evaluation of Living Conditions Aboard Naval Vessels*. Second Interim Report on Proj. OP/S232/S33. Commander Operational Development Force, 1952, 64 pp.
47. U. S. NAVY. Bureau of Supplies and Accounts: Chap. I: Commissary; Vol. IV, Commissary, Clothing and Small Stores and Ship's Store. Bureau of Supplies and Accounts Manual. Washington, D.C., Govt. Print. Off., 1954.
48. HOPKINS, Edward S. and ELDER, Francis B. *The Practice of Sanitation*. Baltimore, The Williams & Wilkins Co., 1951, vii, 423 pp.
49. NATIONAL OFFICE OF VITAL STATISTICS, U. S. Dept. of Health, Education and Welfare. *Accident Fatalities, United States, 1950*. Vital Statistics-Special Reports, National Summaries. Vol. 37, No. 16, Washington, D.C., January 1954.
50. U. S. NAVY. *86th Annual Report of the Surgeon General of the U. S. Navy, Medical Statistics*. NavMed P-154, Washington, D.C., 1950, x, 222 pp.
51. U. S. NAVY. *87th Annual Report of the Surgeon General of the U. S. Navy, Medical Statistics*. NavMed P-5027, Washington, D.C., 1951, x, 243 pp.
52. U. S. NAVY. *88th Annual Report of the Surgeon General of the U. S. Navy, Medical Statistics*. NavMed P-5027, Washington, D.C., 1952, x, 215 pp.
53. FELIX, R. H. What Emotions Do To Your Driving. *American Motorist*, AAA Motor Clubs, Vol. XXIII, No. 4, August 1954, 9-10.
54. U. S. NAVY. Bureau of Medicine and Surgery. *Frigid Zone Medical and Dental Practice*. NavPers 10856, Washington, D.C., December 1949, iii, 197 pp.
55. LORING, J. C. *Selected Bibliography of the Effects of High Intensity Noise on Man*. The Journal of Speech and Hearing Disorders. Monograph Supplement 3, January 1954.
56. BENOX REPORT. *An Exploratory Study of the Biological Effects of Noise*. Contract N6 ori-020 Task Order 44. ONR Project NR 144079. The University of Chicago. 1 December 1953, v, 116 pp.
57. SCHAFER, H. Rudolph. Behavior Under Stress: A Neurophysiological Hypothesis. *Psychological Review*, American Psychological Assn., Inc., September 1954, 61: 323-333.
58. SELYE, Hans. The General Adaptation Syndrome and The Diseases of Adaptation. *J. of Clinical Endocrinology*, 1946, 6: 117-196.
59. DIVISION OF MEDICAL SCIENCES, National Research Council and the Army Medical Service Graduate School, Walter Reed Army Medical Center. *Symposium on Stress*. Washington, D.C., 1953, ix, 332 pp.
60. U. S. NAVY. *Survival on Land and Sea*. Office of Naval Intelligence, Washington, D.C., 1943, 187 pp.
61. LIFE. *The World We Live In: Miracle of the Sea—Part II*. February 9, 1953.
62. TRESSLER, D. K. and LEMON, J. McW. *Marine Products of Commerce*. 2nd edition. New York, Reinhold Publishing Corp., 1951, xiii, 782 pp.
63. U. S. NAVY. They Swim to Work. *All Hands*. The Bureau of Naval Personnel Information Bulletin. NavPers-O. No. 450. August 1954, 21.
64. HALSTEAD, B. W. and LIVELY, W. M., Jr. Poisonous Fishes and Ichthyosarcotoxism: Their Relationship to the Armed Forces. *United States Armed Forces Medical Journal*. February 1954, Vol. V, No. 2, 157-175.
65. SCHNEIDER, Edward C. Observation on Holding the Breath. *Amer. J. of Physiology*, 1930, 94-95: 464-470.
66. U. S. NAVY. *Bureau of Ships Diving Manual*. NavShips, 250-880, Washington, D.C., July 1952.
67. NATIONAL SECURITY RESOURCES BOARD. Civil Defense Office. *Survival Under Atomic Attack*. NSRB Doc. 130. Washington, D.C., Govt. Print. Off., 31 pp.
68. U. S. ARMY. *Military Biology and Biological Warfare Agents*. TM 3-216. Washington, D.C., Govt. Print. Off., 1952, iii, 132 pp.
69. REID, Roger. Bacteria, Bombs and Bullets. *Research Reviews*. Office of Naval Research, Dept. of the Navy, Washington, D.C., April 1953.
70. LIFE. Biological Warfare. *Life*, August 13, 1952, 43-48.
71. U. S. NAVY. *Chemical and Biological Warfare Defense*. Navy Training Courses, NavPers 10098. Washington, D.C., Govt. Print. Off., 1952, vi, 288 pp.
72. U. S. NAVY. *Biological Warfare Defense*. USN Technical Publication NavDocks TP-PL-4, Washington, D.C., Dept. of the Navy, Bureau of Yards and Docks, Rev. April 1953, xv, 95 pp.
73. FEDERAL CIVIL DEFENSE ADMINISTRATION. *What You Should Know About Biological Warfare*. Publication PA-2. Washington, D.C., Govt. Print. Off., February 1951, 30 pp.
74. RYAN, Cornelius. G-Gas. *Collier's*, November 27, 1953, 89-95.

# **Exhibit 5**

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# NAVAL ORIENTATION



DEPARTMENT OF THE NAVY

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# I. ORIENTATION DEPARTMENT OF THE NAVY

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## CHAPTER 9

# DEPARTMENT OF THE NAVY

## ORGANIZATION FOR NATIONAL SECURITY

### Introduction

The purpose of this chapter is to give you an overview of the organization of the Department of the Navy. (The Department of the Navy is the entire Naval Establishment; the Navy Department is the headquarters part at Washington, D. C.) However, the Navy is but one of three military departments within the Department of Defense (DOD). In turn, the Department of Defense is one of three agencies in the Organization for National Security.

To assist the President of the United States with all the interacting matters of security—resources, munitions, and intelligence as well as military operations—the National Security Act of 1947 established three agencies to comprise the Organization for National Security. These agencies were the National Security Council (NSC), the National Military Establishment (NME), and the National Security Resources

Board (NSRB). The same law created a Secretary of Defense to head the NME and to be a member of the President's Cabinet. The Secretaries of Army, Navy, and Air Force retain the right to free access to the President, but are not members of the Cabinet.

By various amendments and reorganization acts since 1947 the National Military Establishment has been renamed the Department of Defense (DOD), the National Security Resources Board has been dropped, and the Office of Defense Mobilization (ODM) has been created.

Chart I on the next two pages summarizes the character and mission of each of the three agencies for national security.

Chart I reads down to the military departments: the Army, Navy, and Air Force. (They are stated in that order in accordance with their historical beginnings.) Our concern now is with the Navy.

## DEPARTMENT OF THE NAVY

### General Consideration

The National Security Act of 1947 describes the functional organization of the Department of the Navy as follows:

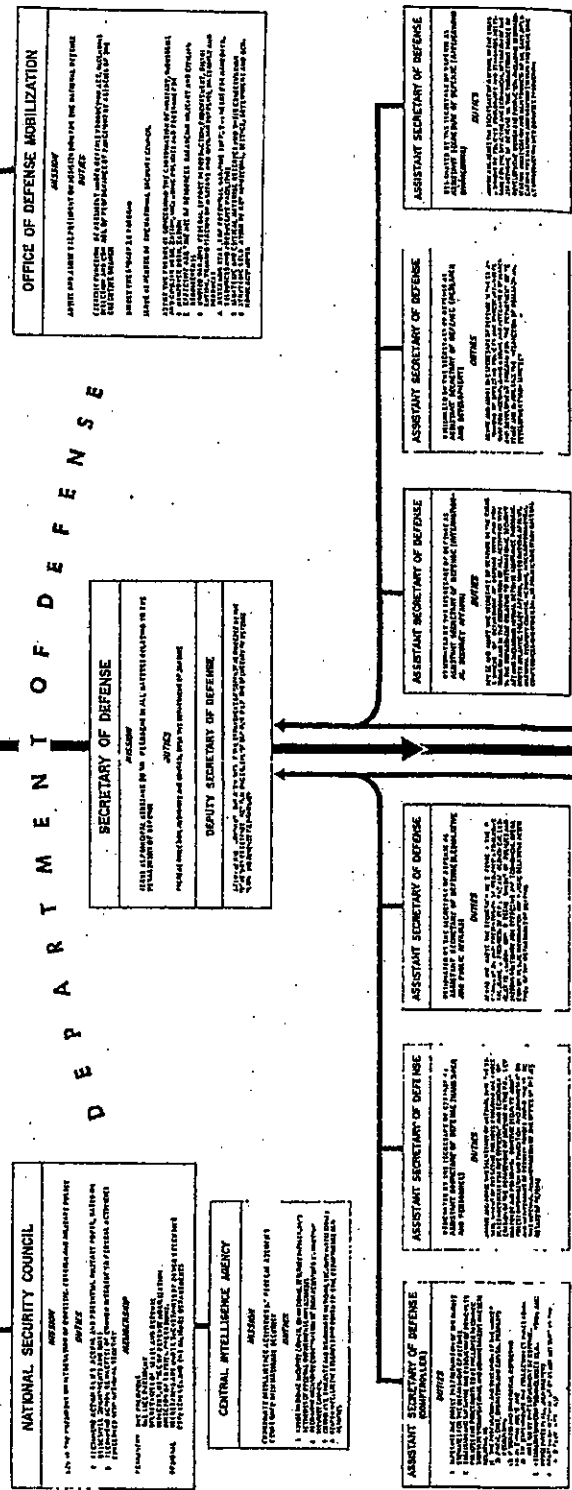
The term "Department of the Navy" as used in this Act shall be construed to mean the Department of the Navy at the seat of government; the Headquarters, United States Marine Corps; the entire operating forces of the United States Navy, including naval aviation, and of the United States Marine Corps, including the reserve components of such forces; all field activities, headquarters, forces, bases, installations, activities, and functions under the control or supervision of the Department of the Navy; and the United States Coast Guard when operating as a part of the Navy pursuant to law.

In general the United States Navy, within the Department of the Navy, shall include naval combat and service forces and such aviation as may be organic therein. It shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea. It shall be responsible for the preparation of naval forces necessary for the effective prosecution of war except as otherwise assigned, and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Navy to meet the needs of war.

All naval aviation shall be integrated with the naval service as part thereof within the Department of the Navy. Naval aviation shall consist of combat and service and training forces, and shall include land-based naval aviation, air transport essential for naval operations, all air weapons and air techniques involved in the

DEPARTMENT OF DEFENSE

**PRESIDENT OF THE UNITED STATES**





# AL ORIENTATION DEPARTMENT OF THE NAVY

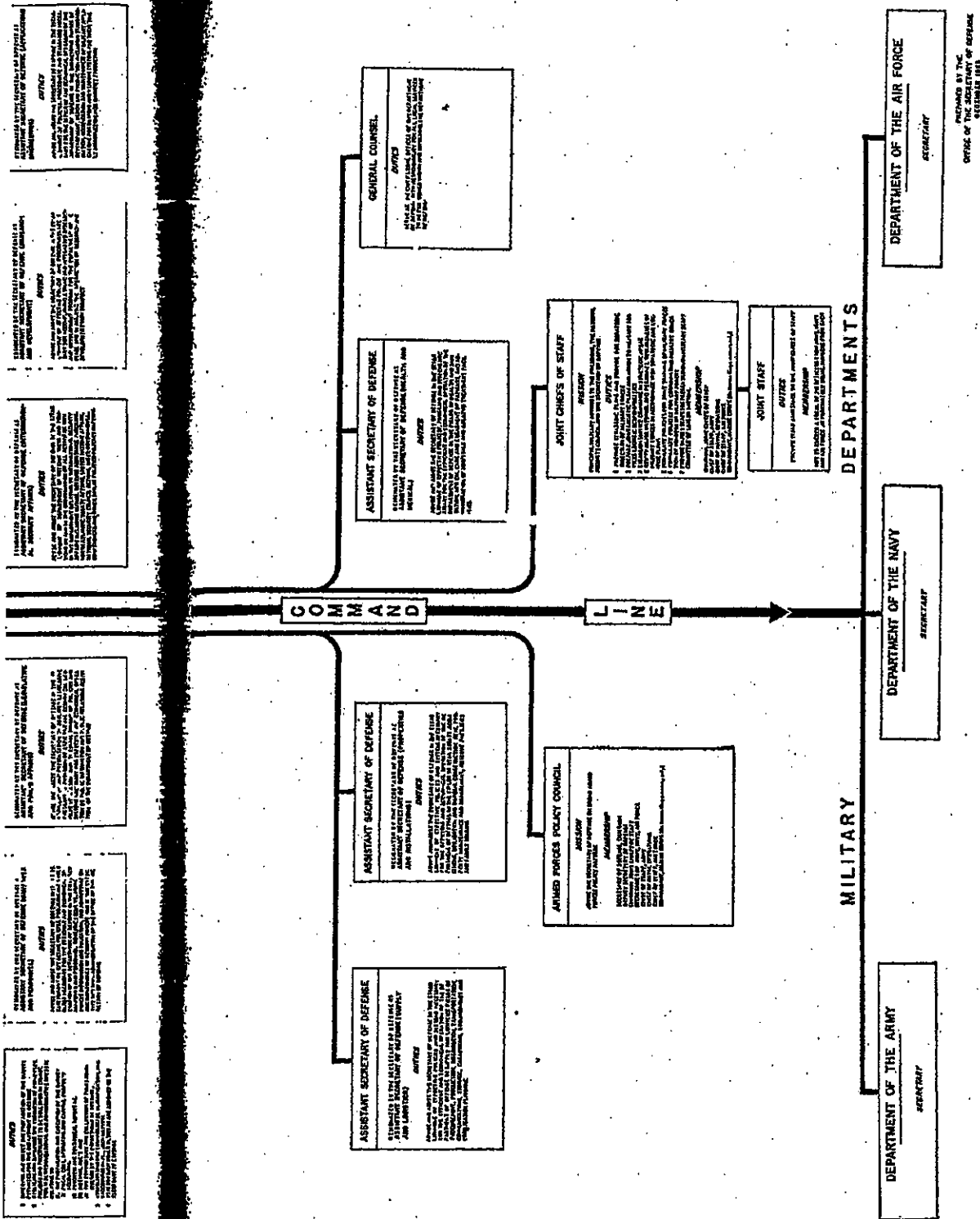


CHART 1.—ORGANIZATION FOR NATIONAL SECURITY

## NAVAL ORIENTATION

operations and activities of the United States Navy, and the entire remainder of the aeronautical organization of the United States Navy, together with the personnel necessary therefor.

The Navy shall be generally responsible for naval reconnaissance, antisubmarine warfare, and protection of shipping.

The Navy shall develop aircraft, weapons, tactics, techniques, organization, and equipment of naval combat and service elements; matters of joint concern as to these functions shall be coordinated between the Army, the Air Force, and the Navy.

The National Security Act of 1947 also describes the organization and functions of the Marine Corps:

The United States Marine Corps, within the Department of the Navy, shall be so organized as to include not less than three combat divisions and three air wings, and such other land combat, aviation, and other services as may be organic therein, and except in time of war or national emergency hereafter declared by the Congress, the personnel strength of the Regular Marine Corps shall be maintained at not more than four hundred thousand. The Marine Corps shall be organized, trained and equipped to provide Fleet Marine Forces of combined arms, together with supporting air components, for service with the fleet in the seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign. It shall be the duty of the Marine Corps to develop, in coordination with the Army and the Air Force, those phases of amphibious operations which pertain to the tactics, technique, and equipment employed by landing forces. In addition, the Marine Corps shall provide detachments and organizations for service on armed vessels of the Navy, shall provide security detachments for the protection of naval property at naval stations and bases, and shall perform such other duties as the President may direct: Provided, that such additional duties shall not detract from or interfere with the operations for which the Marine Corps is primarily organized. The Marine Corps shall be responsible, in accordance with integrated joint mobilization plans, for the expansion of peacetime components of the Marine Corps to meet the needs of war.

## THE NAVY DEPARTMENT

As stated in General Order 5, it is fundamental naval policy to maintain the Department of the Navy as a thoroughly integrated entity with sufficient strength on the sea and in the air to uphold, in conjunction with our other Armed

## Navy Organization and Functions

Although the National Security Act of 1947 set forth basic Navy responsibilities, later amplifications have been promulgated. The President and the JCS issued a paper on April 28, 1948, entitled "Functions of the Armed Forces and the Joint Chiefs of Staff." It specifies four purposes common to all three services for military operations: (1) to support and defend the Constitution of the United States against its enemies, foreign or domestic; (2) to maintain the security of the United States, its possessions and areas vital to its interests; (3) to uphold and advance the national policies and interests of the United States; and (4) to safeguard the internal security of the United States.

Using this 1948 document as an authority, the Department of the Navy, in General Order No. 5, established three principal organizational components which are:

1. *The Operating Forces*: the several fleets, seagoing forces, sea frontier forces, district forces, Fleet Marine Forces and other assigned Marine Forces, the Military Sea Transportation Service, and such shore activities of the Navy and other forces and activities as may be assigned to the operating forces by the President or Secretary of the Navy.

2. *The Navy Department*: the central executive authority of the Department of the Navy located at the seat of the government, which comprises the bureaus, boards, and offices of the Navy Department; the Headquarters of the Marine Corps; and the Headquarters of the Coast Guard (when assigned to the Navy).

3. *The Shore Establishment*: all other activities of the Department of the Navy including those operating forces of the Marine Corps which are not assigned to the Operating Forces of the Navy or to a unified or joint command.

Forces, our national policies and interests; to support our commerce and our international obligations; and to guard the United States, including its overseas possessions and dependencies. The fulfilling of this policy imposes

## AL ORIENTATION

## DEPARTMENT OF THE NAVY

is upon the executive administration of the Department of the Navy four principal tasks:

a. First, to interpret, apply, and uphold the national policies and interests in the development and use of the Department of the Navy. This task may be described as the "policy control" of the Department of the Navy.

b. Second, to command the Operating Forces, and to maintain them in a state of readiness to conduct war; and to promulgate to the Department of the Navy directives embracing matters of operations, security, intelligence, discipline, naval communications, and similar matters of naval administration. This task may be described as the "naval command" of the Department of the Navy.

c. Third, to coordinate and direct the efforts of the Navy Department and the Shore Establishment to assure the development, procurement, production and distribution of material, facilities and personnel to the Operating Forces. This task may be described as the "logistics administration and control" of the Department of the Navy.

d. Fourth, to develop and maintain efficiency and economy in the operation of the Department of the Navy with particular regard to matters of organization; staffing; administrative procedures; the utilization of personnel, materials and facilities; and the budgeting and expenditure of funds. This task may be described as the "business administration" of the Department of the Navy.

The first and third tasks require additional comment. Policy control includes guidance to the Navy as a whole, appraisal of its overall performance, and public relations in the broadest sense. Logistics has two phases: consumer logistics, and producer logistics. The former involves the planning and forecasting of requirements on the basis of operational plans, a responsibility of the Chief of Naval Operations. The latter involves the developing and procuring of these requirements. Consumer logistics is intimately associated with naval command while producer logistics is a matter of business administration. The two, of course, are closely related.

and interests; to our international United States, in- ions and depend- is policy imposed

## Distribution of Executive Responsibilities

The *Secretary of the Navy* has six civilian executive assistants and a larger number of naval professional assistants, including the naval command assistant (Chief of Naval Operations) and the naval technical assistants. Two executive assistants added in 1954 are the Assistant Secretary (Financial Management) and the Assistant Secretary (Personnel and Reserve Forces).

## Secretary of the Navy

The Secretary of the Navy (SecNav) directs and controls the entire naval establishment and retains immediate responsibility for:

1. policy direction of the Department of the Navy;
2. relations with the Congress, the Secretary of Defense, other principal government officials, and the public;
3. morale and welfare of the personnel of the Department of the Navy;
4. liaison with the Assistant Secretary of Defense (Legislative and Public Affairs); and
5. the Office of Information.

## Civilian Executive Assistants

The Civilian Executive Assistants handle business administration and producer logistics, exercising top management coordination of the work of the many bureaus and offices in the Navy Department. Bureau heads, however, have direct liaison with the Secretary, although routinely most of their business is transacted either through the Chief of Naval Operations or one of the civilian executive assistants. The balancing of military with civilian authority and responsibility within the Navy is shown by the division between the naval command assistant with his subordinates and the civilian executive assistants with their staffs.

The *Under Secretary of the Navy* is assigned the responsibility for supervising and directing the work of four Assistant Secretaries of the Navy and the Administrative Assistant to the Secretary, and for collaborating with the Chief of Naval Operations and the Commandant of the Marine Corps in the efficient administration of

## NAVAL ORIENTATION

DEPAR

the Department of the Navy. His responsibility includes:

1. assuring that the business administration and management of the department is carried out in an efficient and economical manner;
2. analysis and review of departmental plans and programs, both current and mobilization;
3. chairmanship of the Executive Committee of the Department of the Navy;
4. supervision and direction of the work of the Naval Inspector General related to the business administration and management of the department;
5. liaison with the General Counsel, Department of Defense, and

6. immediate supervision of the Office of the Judge Advocate General, the Office of the General Counsel, the Office of Analysis and Review, and the Office of Naval Petroleum and Oil Shale Reserves.

The *Assistant Secretary of the Navy (Material)* is assigned the responsibility for policy, management and control of production, procurement, supply and distribution of material; and of the acquisition, construction, management, maintenance and disposition of real estate and facilities. His responsibility includes:

1. coordination and direction of the efforts of the bureaus and offices and Headquarters of the Marine Corps in material matters, including the promulgation of, and review and evaluation of compliance with, policies and procedures governing (a) the procurement, production and disposal of material, and the acquisition, maintenance and disposal of facilities and installations and equipment pertaining thereto, and (b) the determination of requirements and the administration of inventory control systems, in collaboration with the Chief of Naval Operations and the Commandant of the Marine Corps;
2. chairmanship of the Material Committee, and of the Facilities Committee;
3. representation of the procurement requirements of the department before other governmental agencies controlling the availability of products, materials, and facilities;
4. matters relating to the procurement, construction, and maintenance of public housing and quarters;
5. liaison with the Renegotiation Board;
6. procurement and related matters affecting the Military Sea Transportation Service;

7. matters concerning labor relations with respect to Navy contractors, and the implementation and administration of industrial security matters;

8. coordination of departmental matters concerning the Mutual Defense Assistance Program;

9. liaison with the Assistant Secretaries of Defense (Supply and Logistics), (Application Engineering), (Properties and Installations), and (International Security Affairs), and

10. immediate supervision of the Office of Naval Material.

The *Assistant Secretary of the Navy (Air)* is assigned responsibility for policy, management and control of aeronautical matters, and of matters related to research and development and atomic energy. His responsibility includes:

1. departmental participation in the Air Coordinating Committee, and coordination with other governmental agencies and civilian aviation interests on aviation matters;

2. coordination and direction of the efforts of the bureaus and offices and Headquarters of the Marine Corps in research and development and atomic energy matters, including the promulgation of, and review and evaluation of compliance with, policies and procedures governing the correlation and programming of research, experimental, test and developmental activities;

3. chairmanship of the Research and Development Committee, Department of the Navy;

4. liaison with the Assistant Secretary of Defense (Research and Development) and the Assistant to the Secretary of Defense (Atomic Energy), and coordination with other agencies on these matters, and

5. immediate supervision of the Office of Naval Research.

The *Assistant Secretary of the Navy (Financial Management)* is assigned responsibility for financial management of the Department of the Navy, and is designated and appointed Comptroller of the Navy. His responsibility includes:

1. policy, management and control of the functions of budgeting, accounting, financing, progress and statistical reporting, and internal auditing, including contractors' accounts throughout the department;

2. liaison with the Assistant Secretary of Defense (Comptroller); and

DEPARTMENT OF THE NAVY

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## DEPARTMENT OF THE NAVY

## DEPARTMENT OF THE NAVY

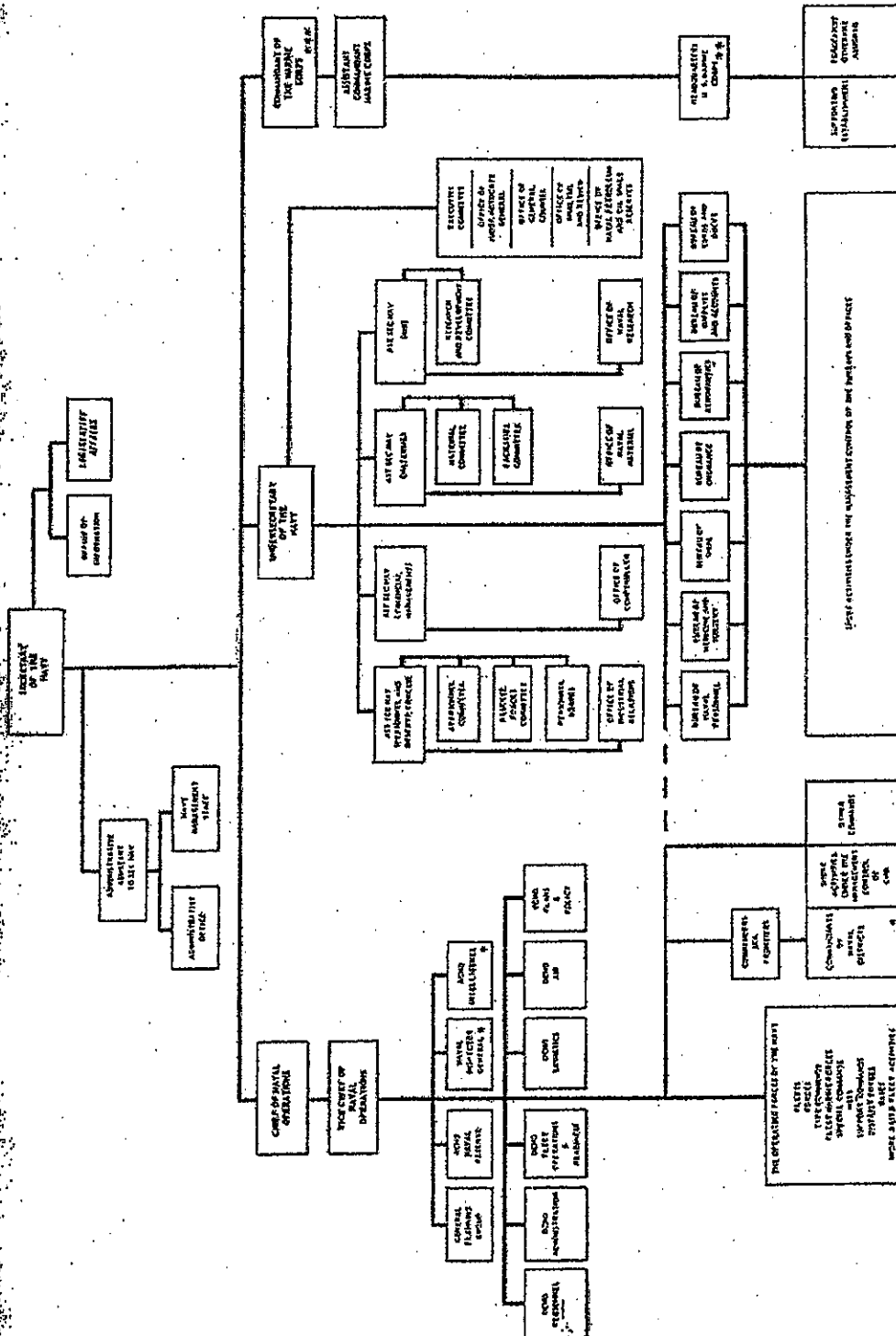


CHART II.—DEPARTMENT OF THE NAVY

1. All naval operations are under the command of the Secretary of the Navy.

2. The Chief of Naval Operations is the principal executive officer of the Department of the Navy.

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## NAVAL ORIENTATION

3. immediate supervision of the Office of the Comptroller of the Navy.

The *Assistant Secretary of the Navy (Personnel and Reserve Forces)* is assigned responsibility for policy, management, and control of functions relating to personnel (military, civilian, and reserve forces). His responsibility includes:

1. coordination and direction of the efforts of the bureaus and offices and Headquarters of the Marine Corps in personnel matters, including, but not limited to the promulgation of, and review and evaluation of compliance with, policies and procedures governing the procurement and administration of personnel;

2. matters related to services for the morale and welfare of the personnel of the department;

3. supervision of military and civilian personnel security programs, and of matters of military justice;

4. matters relating to needs for public housing and quarters;

5. chairmanship of the Personnel Committee, and chairmanship of the Reserve Forces Committee;

6. liaison with the Assistant Secretary of Defense (Manpower and Personnel) and the Assistant Secretary of Defense (Health and Medical); and

7. immediate supervision of the Office of Industrial Relations and of personnel boards, including the Naval Medical Survey Review Board, Naval Retiring Review Board, Board of Decorations and Medals, Physical Review Council, Physical Disability Appeal Board, Naval Examining Boards, Naval Clemency Board, Navy Discharge Review Board, and Board for the Correction of Naval Records.

The *Administrative Assistant to the Secretary of the Navy* is assigned the following responsibilities:

1. general supervision and coordination of all matters affecting departmental administration at the seat of government.

2. general supervision and coordination of all matters relating to (a) the creation, disposition and management of records and correspondence; (b) printing and publications, in-

cluding regulations and controls thereof; and (c) promotion of the sales of U. S. Savings Bonds.

3. general supervision and coordination of all matters affecting the administration of the Executive Office of the Secretary, including organization, staffing, administrative procedures, and funds.

4. immediate supervision of the Administrative Office, Navy Department; the Navy Management Staff; and the Office of Savings Bonds.

## Office of Industrial Relations

The Office of Industrial Relations is responsible for the development of the Navy's industrial relations program for civilian employees. It advises and assists bureaus, offices, and shore activities in the application of the program throughout the departmental and field services. Its fields of interest include all matters relating to the employment, assignment, transfer, promotion, separation, performance rating, and training of civilian employees, as well as those relating to wage administration, classification, employee relations, safety engineering, and personnel studies and statistics.

The Office of Industrial Relations is also responsible for developing industrial relations policies, interpreting established policies, and recommending changes in policy. It is responsible for coordinating the department's overall program so that uniform standards are maintained throughout the Naval Establishment.

## Administrative Office

The Administrative Office, Navy Department, is responsible for the general administration and business management of the department and administers certain management programs and appropriations for the Naval Establishment.

It is responsible for departmental civilian personnel administration and for departmental management services, including building space and maintenance, security of buildings and grounds, mail, telephone, office equipment and supplies, warehousing, duplicating, civilian payrolls, transportation, and employee health and welfare activities. It also provides personnel publications, and administrative and general





## NAVAL ORIENTATION

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office services for the Secretary's Office and the Executive Office of the Secretary.

Management programs administered for the Naval Establishment include the reduction and control of reports, forms control, correspondence and records management, records disposal, application and use of microphotography, staff assistance on office systems and procedures, and printing and publications control. It operates Records Management Centers (including micro-filming plants therein), District Records Management Offices and District Publications and Printing Offices, and maintains technical control over the Regional Publications Distribution Centers.

Appropriations assigned for fiscal administration provide support for several nationwide and department-wide programs. This office plans, coordinates, and directs the program on finance, budgeting, and accounting for activities under the cognizance of the Executive Office of the Secretary. It consolidates budget estimates and justifications of departmental and field activities under the cognizance of the Executive Office of the Secretary, Office of the Judge Advocate General, and Office of the Chief of Naval Operations into a single appropriation estimate. It exercises budgetary con-

trols and consolidates accounting data for the Navy Management Fund and performs certain appropriation budgeting and accounting for several of the subheads therein.

## Office of Information

Among the functions of the Office of Information are advising the Secretary of the Navy on policies and methods relative to public relations and the dissemination of information. It collects, evaluates, coordinates, and disseminates information originating within the bureaus and offices of the Navy Department and the Shore Establishment, and it coordinates Marine Corps public information matters with the Office of Information. This office also coordinates and develops channels between the Navy and the public for the accomplishment of its mission. It stimulates public interest in naval activities through liaison with civil organizations and disseminates public information directives of the Department of Defense. It is also responsible for imparting to the personnel of the Navy and Marine Corps, including the Reserve components thereof, appropriate information on current policies and programs of the Navy Department.

## NAVAL COMMAND ASSISTANT

## The Chief of Naval Operations (CNO)

The Chief of Naval Operations is the highest ranking officer in the Department of the Navy. As such he is a member of the Joint Chiefs of Staff and is the principal naval adviser to the President, Secretary of Defense, and Secretary of the Navy. He is in command of the operating forces and includes among his responsibilities their training, readiness, and war planning. He is required to determine the personnel and material requirements of the operating forces and to this end coordinates and directs the efforts of the various bureaus and offices of the Navy Department. Chart III outlines the current organization of the Office of the Chief of Naval Operations (OpNav).

The Vice Chief of Naval Operations (VCNO) is the principal staff assistant to the CNO. He supervises the VI Deputy Chiefs of Naval Oper-

ations (DCNO), namely: *Personnel, Administration, Fleet Operations and Readiness, Logistics, Air, and Plans and Policy*. Additional staff assistants to CNO are: the Director of the General Planning Group, the Assistant Chief of Naval Operations (Naval Reserve), the Assistant Chief of Naval Operations (Intelligence), and the Naval Inspector General. Also assisting the VCNO is the Director of the Progress Analysis Group, who reports on Navy-wide progress and readiness for war, and the Coordinator of Electronics Programs. Both the Commandant of the Marine Corps and the Commandant of the Coast Guard (in wartime) deal directly with the Chief of Naval Operations on appropriate matters of interest.

By general policy either the Chief or the Vice Chief of Naval Operations is a naval aviator to ensure full representation of aviation needs. The Vice Chief as well as the Deputy and Assist-



## DEPARTMENT OF THE NAVY

any Chiefs derive their authority solely from the Chief of Naval Operations. Although not inflexible or fixed by formal regulations, the most frequent relationships between CNO and the bureaus are as follows: DCNO (Logistics) with Yards and Docks, Ordnance, Supplies and Accounts, Ships, Medicine and Surgery; DCNO (Personnel) with Personnel; and DCNO (Air) with Aeronautics.

The Assistant Chief of Naval Operations (Intelligence) has direct responsibility both to the Chief of Naval Operations and to the Secretary of the Navy. He is also the Director of Naval Intelligence (DNI), and his subordinate organization is the Office of Naval Intelligence (ONI). Prior to June 1954 the Director of Naval Intelligence was subordinate to the DCNO (Operations) in a position similar to that now occupied by the Director of Naval Communications. The reorganization in June 1954 established the Director of Naval Intelligence as an ACNO, a staff position similar to the General Staff (G-2).

position held by the Assistant Chief of Staff for Intelligence, U. S. Army.

The Naval Inspector General reports both to the Chief of Naval Operations and to the Secretary of the Navy. He investigates and reports on all matters affecting the discipline and military efficiency of the Navy, making such recommendations as are required. In his work he has great latitude, and every part of the service is open to his scrutiny. His investigations are not to be confused with those made by the Office of Naval Intelligence which relate to security and are made only on request of competent authority.

The General Planning Group prepares broad strategic naval plans and aids in developing logistics requirements in support of such plans. These naval plans are based on plans received from the JCS.

The Chief of Information reports to the CNO but has primary responsibility to the Secretary of the Navy. The work of his Office of Information was described earlier in this chapter.

## MARINE CORPS COMMAND ASSISTANT

The Marine Corps Command Assistant is the Commandant of the Marine Corps. He commands the Marine Corps, and is directly responsible to the Secretary of the Navy for its administration, discipline, internal organization, training, requirements, efficiency and readiness, and for the total performance of the Marine Corps. The Commandant has an additional direct responsibility to the Chief of Naval Operations for the readiness and performance of those elements of the operating forces of the Marine Corps assigned to the Operating Forces of the Navy. Such Marine Corps Forces, when so assigned, are under the command of the Chief of Naval Operations. In addition, the Marine Corps is assigned the following duties:

1. Responsibility for that portion of the task of "logistics administration and control" of the Department of the Navy which embraces (a) planning, forecasting, and determining the requirements of the Marine Corps for equipment, material, personnel and supporting services; (b) determination of Marine Corps characteristics of equipment and material to be procured or developed and the training required to

fit Marine Corps personnel for combat; and (c) collaborating with the Civilian Executive Assistants in fulfillment of requirements of the Marine Corps.

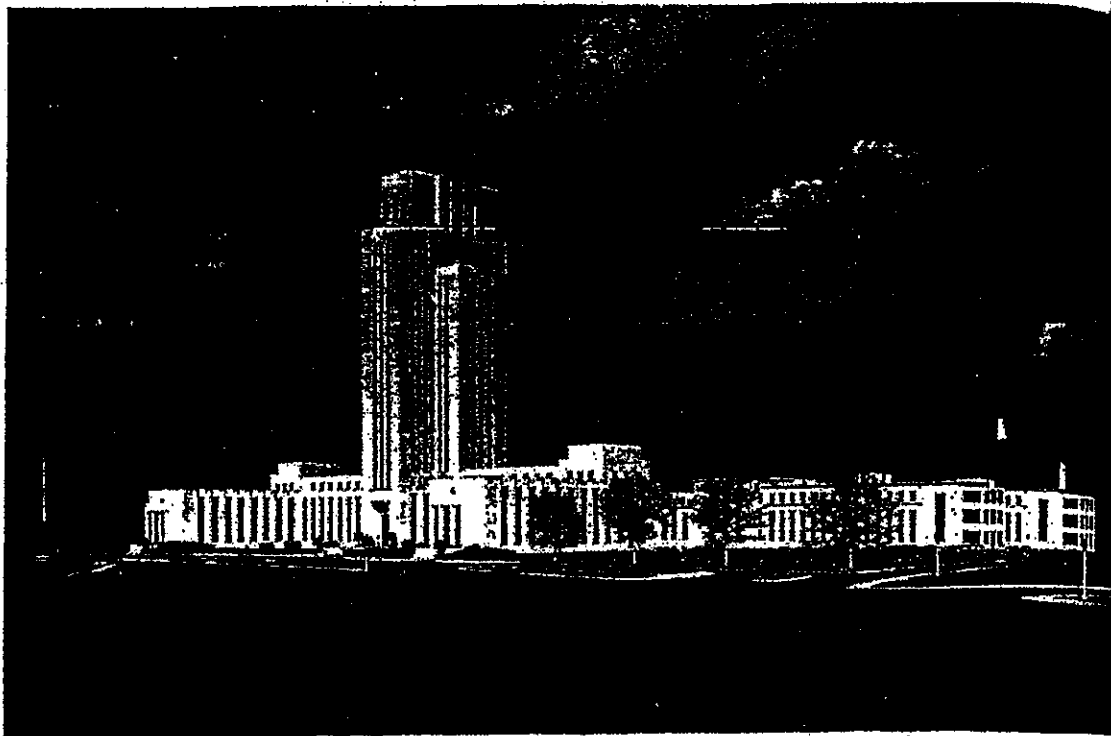
2. Responsibility for the task of "business administration" of the Marine Corps in collaboration with the Civilian Executive Assistants.

3. Providing technical advice to the Secretary of the Navy, the Civilian Executive Assistants and the Chief of Naval Operations in the formulation of policies and procedures for the Department of the Navy.

4. The development, in coordination with the Army and the Air Force, of the tactics, techniques, and equipment employed by landing forces in amphibious operations.

5. Meeting with the Joint Chiefs of Staff when matters which directly concern the United States Marine Corps are under consideration by them. With respect to such matters the Commandant of the Marine Corps has coequal status with members of the Joint Chiefs of Staff. (See Chapter 25 for more information about the organization and administration of the Marine Corps.)

NAVAL ORIENTATION



NATIONAL NAVAL MEDICAL CENTER, BETHESDA, MARYLAND

Research in medicine is conducted at the Naval Medical Research Institute which is a part of the Medical Center.

### NAVAL TECHNICAL ASSISTANTS

The Navy Technical Assistants are the Chiefs of Bureaus, the Chief of Naval Research, the Chief of Naval Material, and the Judge Advocate General. They are the technical advisers and assistants in their special fields to the Secretary, the Civilian Executive Assistants, and the Chief of Naval Operations. Within the limits of their respective cognizance, they are immediately responsible for:

1. The planning and translation of approved requirements into firm procurement schedules;
2. The research in, and the development, procurement, production, utilization, and distribution of material and facilities;
3. The procurement, training, administration, assignment, and utilization of personnel;
4. The operation and management of all activities assigned to them; and

5. The sound and legal expenditure of funds appropriated for the performance of the work including the preparation of estimates of funds required to carry out approved plans and directives.

The Naval Technical Assistants perform their responsibilities through the organization of their respective bureaus and offices.

#### Bureau of Aeronautics

The Bureau of Aeronautics is responsible for the design, development, procurement, production, test, fitting out, maintenance, alteration, repair, and material effectiveness of all Navy and Marine Corps aircraft (heavier-than-air and lighter-than-air), target drones, and of certain guided missiles, including components and equipment thereof; and of photographic and aerological equipment; the research thereon and all pertinent functions relating thereto.

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**Bureau of Medicine and Surgery**

The Bureau of Medicine and Surgery is responsible for safeguarding the health of personnel of the Navy; the procurement of all medical and dental materials; research in medicine and dentistry; evaluation of the performance characteristics, from the physiological standpoint, of equipment designed for use in the naval service; the determination of standards of sanitation and hygiene; the professional education and training of medical personnel; and the establishment of professional medical and dental standards for clinical methods and procedures.

**Bureau of Naval Personnel**

The Bureau of Naval Personnel is responsible for procuring and distributing all personnel of the Navy; recruit, basic, and technical training and education of all military personnel of the Navy as individuals except professional medical education and aviation training; maintaining records of service of all personnel of the Navy; establishing complements and allowances for all activities of the Navy; and supervising welfare, promotion, discipline, discharge and retirement of all personnel of the Navy.

**Bureau of Ordnance**

The Bureau of Ordnance is responsible for the design, development, procurement, manufacture, distribution, maintenance, repair, alteration, and material effectiveness of naval ordnance; the research therein; and all pertinent functions relating thereto, including the control of storage and terminal facilities for and the storage and issue of ammunition and ammunition details.

**Bureau of Ships**

The Bureau of Ships is responsible for the design, procurement, construction and repair of ships and small craft; design, development, procurement, and distribution of (a) materials for defense against chemical, biological and radiological warfare in ships, (b) respiratory protective devices, diving equipment, mine counter-

measures, submarine rescue methods and submarine escape training facilities, and (c) special devices of the Naval Communication Service, and radio, radar, radiac, and sonar equipments and accessories for use ashore; establishing specifications for fuels and lubricants to be used in naval vessels; and provision of equipage for salvaging vessels. The Bureau has management control of all United States naval shipyards.

**Bureau of Supplies and Accounts**

The Bureau of Supplies and Accounts supervises the procurement, receipt, custody, warehousing, and issuance of Navy supplies and materials; develops plans, formulates policies, and specifies procedures to be followed in the performance of supply and specified fiscal functions afloat and ashore; supervises and directs the operation of the supply phases of the Navy Supply System; and administers the redistribution program of excess personal property within the Department of Defense and the sale of Navy surplus property. It develops and implements the industrial mobilization planning program with respect to the material under the Bureau's control. The Bureau has control of the loading and unloading of cargo ships and it procures, operates and administers cargo terminal facilities. It supervises disbursements for military and civilian payrolls and for articles and services procured for the Navy.

**Bureau of Yards and Docks**

The Bureau of Yards and Docks is responsible for the design, planning, development, procurement, construction, alteration, cost estimates, inspection and repair of public works and public utilities at all shore activities; the acquisition and disposal of real estate except for Marine Corps leases; determination and authorization of the rates of sale of utility services; coordination of the procurement of utility services required by shore activities; and development, procurement, and distribution of materials for defense ashore against chemical, biological, and radiological warfare. This Bureau organizes and maintains the Construction Battalions (Seabees).

NAVAL ORIENTATION

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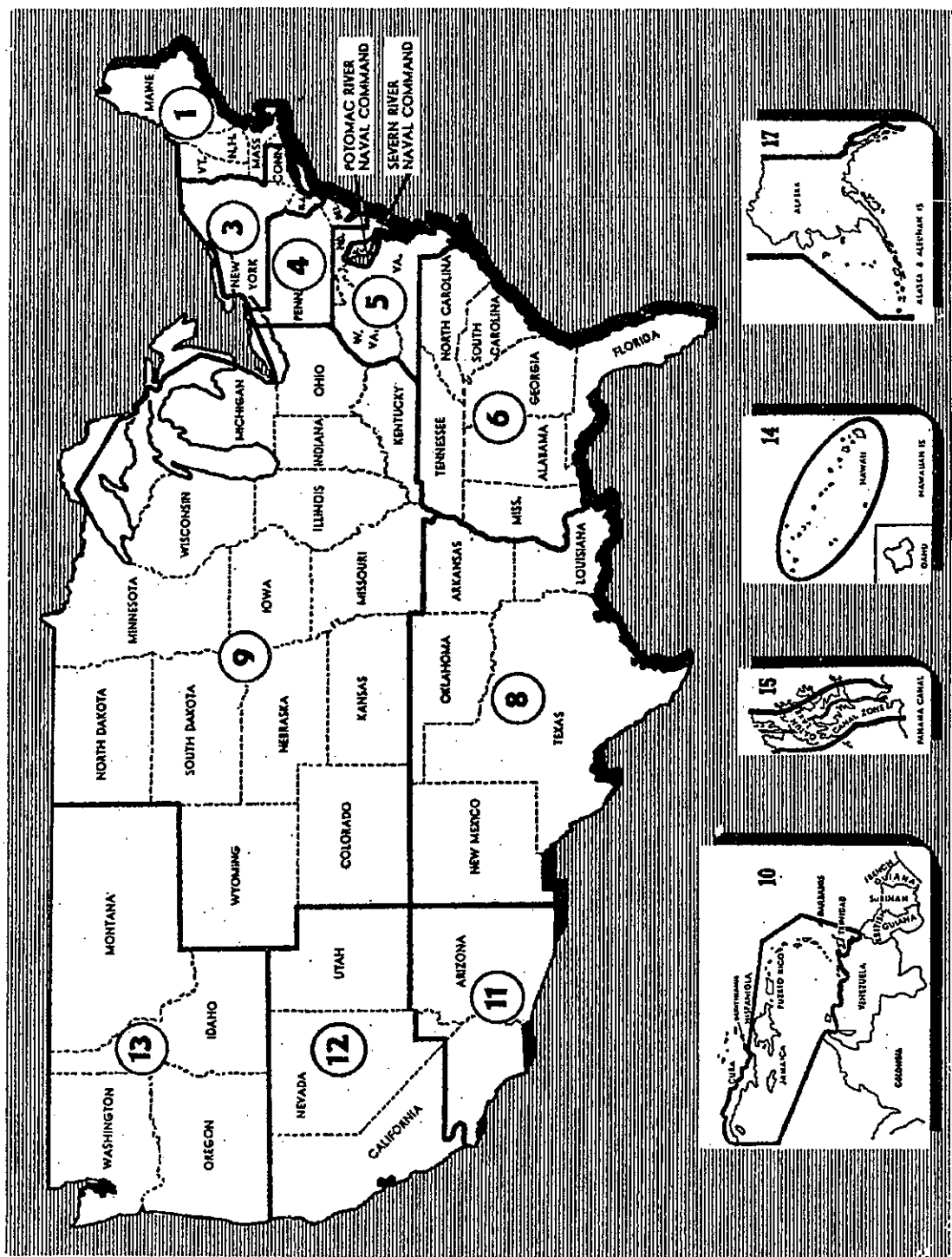


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## DEPARTMENT OF THE NAVY

### Office of the Judge Advocate General

The Office of the Judge Advocate General is responsible for all legal matters of the Navy in the field of military, administrative, legislative, and general law. This responsibility covers the entire legal field except the areas of commercial law assigned to the Office of General Counsel, patent law assigned to the Office of Naval Research, and real estate law assigned to the Bureau of Yards and Docks.

### Office of Naval Research

The Office of Naval Research is responsible for the encouragement, promotion, planning, initiation, and coordination of naval research; the conduct of naval research in augmentation of, and in conjunction with, research conducted by other bureaus, offices and agencies of the

Navy; and the supervision, administration, and control of activities within or on behalf of the Navy Department relating to patents, inventions, trade-marks, copyrights, and royalty payments.

### Office of Naval Material

The Chief of Naval Material is responsible for carrying out policies and plans for the procurement, contracting, and production of material throughout the Naval Establishment. He determines the procurement and production policies and methods to be followed by the Naval Establishment to meet the material requirements determined by the Chief of Naval Operations to be necessary to the support of the Operating Forces, and coordinates and directs the bureaus and offices in this respect.

## THE SHORE ESTABLISHMENT

The Shore Establishment includes the field activities of the bureaus and offices of the Navy Department and all shore activities not assigned to the operating forces. These are largely involved in producer logistics for the support of the operating forces. Although located principally in coastal areas, they may be scattered anywhere throughout the United States and its territories.

In other words, the Shore Establishment consists of district activities, fleet activities based ashore, Marine Corps supporting activities, and the Naval Air Training Command.

### Naval Districts

There are 14 naval districts and two river naval commands. Their headquarters are as follows: First, Boston, Mass.; Third, New York, N. Y.; Fourth, Philadelphia, Pa.; Fifth, Norfolk, Va.; Sixth, Charleston, S. C.; Eighth, New Orleans, La.; Ninth, Great Lakes, Ill.; Tenth, San Juan, P. R.; Eleventh, San Diego, Calif.; Twelfth, San Francisco, Calif.; Thirteenth, Seattle, Wash.; Fourteenth, Pearl Harbor, T. H.; Fifteenth, Balboa, C. Z.; Seventeenth, Kodiak, Alaska; Potomac River Naval Command, Washington, D. C.; Severn River Naval Command, Annapolis, Md.

The inclusion within the above boundaries of

islands, land masses, or territorial waters of sovereign countries other than the United States does not extend the command functions and responsibilities of the commandants to those islands, land masses, or territorial waters. The commandants' responsibilities extend only to United States territories, possessions, naval reservations, and naval activities located within the geographical limits established for the districts and is subject to the provisions of international treaties or agreements.

Each district is under the command of a commandant. He is an officer of the line qualified for command at sea. In his naval district he acts as the representative of the Secretary of the Navy, Chief of Naval Operations, Sea Frontier Commander, and the various bureaus of the Navy Department. His responsibilities include support of the Operating Forces, defense of the district, control of public relations, maintenance of industrial mobilization plans, control of Naval Reserve matters, and maintenance of an efficient intelligence service both for security and operational purposes. Additional duties include operation of naval communications, collaboration with other government authorities, supervision of legal matters, public works, and transportation.

## NAVAL ORIENTATION DEPARTMENT

Thus it can be seen that practically every United States Navy activity is organized under a naval district, thereby providing an effective solution to what was formerly a major administrative problem, namely, the exercising of central control over the widely scattered Shore Establishment. Under its commandant, usually a rear admiral, each district has a staff of officers representing, in general, the various functions handled by the bureaus and offices of the Navy Department.

#### Naval Bases

The mission of a naval base is the furnishing of local services directly to the Operating Forces. By definition, a naval base is a shore command in a given locality which includes and integrates all naval shore activities assigned, and these normally include all those capable of contributing to its mission.

Naval bases that are within naval districts are under the command of the district commandant who may be ordered to additional duty in command of a naval base located at the port where his district headquarters are situated. Each commander of a naval base has under his jurisdiction the naval shipyard and such other activities as may be directed by CNO. Each component activity of a naval base is under the

direct control of a commanding officer or an officer in charge.

*Naval Shipyards.* The naval shipyards, formerly called Navy yards, are components of naval bases. The mission of a naval shipyard is to provide logistic support to the Operating Forces in the form of efficient and economical building, repairs, alterations, overhauling, docking, converting, or outfitting of ships, and related special manufacturing and necessary replenishment of stores and supplies where required.

#### Naval Air Bases Commands

A naval air bases command comprises, with certain exceptions, the Navy and Marine Corps aviation shore activities furnishing facilities for the operation of aircraft in each naval district. Each command is commanded by a line officer of the Navy, a naval aviator, who is under the commandant of the district. Whenever fleet air units are located at air stations in the naval air bases command, the Commander, Naval Air Bases Command, coordinates his logistics support to those units with that of the appropriate Commander, Naval Base. The Commander, Naval Air Bases, has under his jurisdiction such air stations as CNO may direct.

### THE OPERATING FORCES

#### Responsibility of CNO

Overall command of the Operating Forces devolves on the Chief of Naval Operations, subject to the supreme authority vested in the President by the Constitution and in the Secretary of Defense and the Secretary of the Navy by law.

Those parts of the world outside the continental United States in which our Armed Forces are operating are divided into unified commands. This is in accordance with a Joint Chiefs of Staff plan. Each of these commands is under a commander in chief who has unified command over all forces—Army, Navy, and Air Force—assigned to him by the Joint Chiefs of Staff executive agent for the Pacific and Atlantic Commands.

The Operating Forces of the Navy include all fleets, Sea Frontier Forces, District Forces, and such shore activities as are assigned to the Operating Forces by the Chief of Naval Operations.

#### Fleet Commands

Major commands operating directly under the CNO are the Pacific Fleet, the Atlantic Fleet, and U. S. Naval Forces Eastern Atlantic and Mediterranean. Both the Pacific and Atlantic Fleets include ships or forces grouped by types under administrative Type Commanders. These include Amphibious, Air, Battleship, Cruiser, Destroyer, Fleet Marine, Mine, Service, and Submarine Forces; and Training Commands.

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grouped according to type. Officers may and frequently do have responsibilities under both organizations. For instance (Commander Cruisers and Destroyers Pacific (ComCruDes-Pac) may be given an operational assignment as Commander Task Force 34; i. e., Task Force 4 of the Third Fleet.

**Task Forces.**—A task force is a subdivision of a fleet composed of several types of ships according to operational necessity. Thus, a task force may include battleships, aircraft carriers, cruisers, amphibious craft, and auxiliary vessels such as tenders or supply ships. When a fleet is large enough and its duties are extensive enough to require division into many task forces, it is usual to group the task forces into task fleets.

**Task Groups.**—A task force is subdivided into task groups, which are of a more temporary nature than a task force and are usually dissolved after each particular assigned mission. Task groups are assigned numbers corresponding to the particular task force of which they are a part. For instance TF 72 may have a task group assigned to a special mission and its designated number will be TG 72.3. Task groups may be even further subdivided into task units and task elements. For example, TU 72.3.1 is Task Unit 1 of Task Group 3 of Task Force 2 of the 7th Fleet.

**Divisions and Squadrons of Vessels.**—In grouping vessels for administrative purposes, such as the assignment and transfer of enlisted personnel, ships of the same type are grouped together. Any flagships, tenders, and aircraft assigned to these vessels are also grouped with them. The basic unit of vessels by type is the division, and frequently two divisions are joined to make a squadron. The term "squadron" may also apply to an organization of minor strength whose commander operates under "detached" orders or directly under the instructions or orders of CNO.

**Air Wings, Groups, and Squadrons.**—In the organization of aircraft, the squadron is a basic organizational unit. A squadron is commissioned under a squadron commander and is normally composed of aircraft of one type. In carrier aviation an air group is an organization consisting of two or more squadrons of aircraft.

An air wing is made up of two or more squadrons of noncarrier types of aircraft; e. g., transports, seaplane patrols.

#### Sea Frontiers

Sea Frontier Forces are part of the Operational Forces of the Navy. Geographically there are five such forces. The Eastern Sea Frontier (EastSeaFron) includes waters off the Atlantic and Gulf Coasts and the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts, plus Naval Commands of the Potomac and Severn Rivers. The sea frontier command is under CinCLant. The Caribbean Sea Frontier, under the Commander in-Chief, Caribbean, includes the 10th and 15th Naval Districts, plus adjacent waters in the Caribbean and nearby Pacific. The Western Sea (WestSeaFron) under CinCPac includes the 11th, 12th, and 13th Naval Districts as well as Eastern Pacific waters. The Hawaiian Sea Frontier, also under CinCPac, includes the 14th Naval District and Central Pacific waters. The Alaskan Sea Frontier is under Commander in Chief, Alaska, and includes the 17th Naval District and North Pacific waters.

These command relationships are in the field of military operations. Sea Frontier Commanders are responsible for maintaining adequate plans for the defense of their respective areas, both of a naval and a joint nature. They also must be ready to expedite and protect merchant shipping in their areas. Naval participation in search and rescue operations is under their control.

In addition to operational duties, Sea Frontier Commanders are administratively in the chain of command between the Chief of Naval Operations and the District Commandants. This is a military command and coordination control in the interest of uniformity of action and avoidance of duplication among the districts. District Commandants still can deal directly with the Navy Department on matters not involving coordination or the military readiness of their forces.

#### Military Sea Transportation Service

The Military Sea Transportation Service (MSTS), under the Department of the Navy,

It is appropriate explanation of ships that apply to the Navy.

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THE USNS PVT. JOE E. MANN

This is an MSTs cargo vessel manned by a U. S. Civil Service crew.

provides ocean transportation for the Armed Forces and for almost any agency or activity related to national defense. Among other things, MSTs has been called on to transport troops, guns, and heavy fighting equipment; oil, supplies, and building materials; United Nations troops, dependents of Armed Forces men, repatriated prisoners of war, Northern Vietnamese refugees fleeing to Southern Indochina, and displaced persons coming to America; supplies to Arctic air bases, ammunition to Korea, and Mutual Defense Aid to friendly nations; food to Greece, aircraft to Southeast Asia, guns to Europe, horses to Turkey, and Japanese works of art to the United States.

MSTS was established on 1 October 1949 as a single agency under one authority to provide sea transportation for the Department of Defense. The nucleus MSTs fleet was formed by taking over the ships of the Army Transport Service and the Naval Transportation Service. The Korean war spiraled the demand for sea transportation and MSTs added to its fleet by chartering commercial vessels and by "unzipping" ships from the Maritime Administration's Reserve fleets. In June 1953, just before military operations in Korea ended, there were 602 vessels under MSTs control.

From headquarters in Washington, D. C., the Commander, MSTs, directs shipping operations, commercial chartering, ships, planning, and

fiscal and administrative matters. The ships operate directly under area and subarea commands. The four area commands are Atlantic (New York), Pacific (San Francisco), Western Pacific (Yokosuka), and Eastern Atlantic and Mediterranean (London).

Subarea commands are located in Seattle, Honolulu, New Orleans, Canal Zone, Leghorn, and Heidelberg. And there are 30 MSTs offices located in major ports of the world.

MSTS ships are classified as in the nucleus fleet (Navy-owned and operated) or in the commercial fleet. The commercial fleet consists of American Merchant Marine ships which are chartered to MSTs, or space which MSTs buys aboard commercial ships. To meet emergencies MSTs can request the Maritime Administration to break out cargo ships from Reserve fleets and to arrange for shipping companies to operate them.

The Navy-owned ships include Navy Commissioned ships (prefixed by USS) with Navy crews, and in-service ships (prefixed by USNS) with Civil Service marine crews or Merchant Marine crews. In the in-service passenger ships there is a group of Navy personnel called the Military Department. The Civil Service or Merchant Marine master commands the ship; the Military Department commanding officer is in charge of passengers.

Like a Navy task fleet MSTs comes under CNO for operational matters, and under SecNav for procurement matters. The mission of MSTs is threefold:

- (1) To provide sea transportation for personnel and cargoes of the Department of Defense.
- (2) To plan and negotiate for use of commercial shipping to augment the MSTs fleet as necessary.
- (3) To plan for and be capable of expansion in time of war as the Joint Chiefs of Staff may direct.

## COMMAND RELATIONSHIPS

It is appropriate at this point to provide an explanation of the formal command relationships that apply specifically to the Shore Establishment. Our discussion is based on General

Order No. 19 which gives the official definitions.

Command is the authoritative direction exercised over a unit or individual of the Naval Establishment in all matters pertaining to the



## NAVAL ORIENTATION

conduct of naval affairs not specifically excepted by higher authority, and is commensurate with the responsibility imposed. Inherent in command are precedence over all personnel serving with the command, the responsibility for coordinating the efforts of the units or individuals commanded, the power to enforce the official will of the commander through the exercise of the necessary military directions, the authority to make inspections to ensure compliance with such directions, and the initiation or application of authorized disciplinary measures incident thereto. A commander, within his discretion, may delegate the execution of the details to be performed by his authority to appropriate subordinates, but such delegation does not relieve him of the overall responsibility for the performance of the personnel or units under his command.

In General Order No. 19 "command" is subdivided into four components which are defined as follows:

*Military Command* is the authoritative direction exercised over activities of the Naval Establishment in military matters together with the power to exercise authoritative direction in all matters when circumstances dictate.

Military command in the Navy stems from the Chief of Naval Operations, and is exercised over activities of the Shore Establishment through the Sea Frontier Commanders and the District Commandants, the Chief of Naval Air Training, and the Commandant of the Marine Corps. It includes matters characteristic of a military organization, as contrasted to matters of the type provided for under management control in industry and business.

*Coordination Control* is that necessary direction of separate units of the Navy Establishment to ensure adequately integrated relationships between all of these units.

Coordination control is a responsibility of the Chief of Naval Operations, exercised through the Sea Frontier Commanders and the District Commandants, over shore activities located within the several districts. It fulfills the two-fold purpose of providing for orderly and complete service in support of the operating forces

and coordination between shore activities under different commands.

*Management Control* is the direction exercised, in other than military matters, by an authority of the Naval Establishment over a unit of the naval shore establishment in the administration of its local operating functions.

Management control is exercised by the designated bureau or office of the Navy Department over a field activity in the non-military administration of its functions. Bureau management reflects the policies and procedures of the Civilian Executive Assistants in the fields of business administration and producer logistics, and includes overall responsibility for the work performed. It is to be noted that, in the operating forces, management control is included in "command" and is always the responsibility of the Chief of Naval Operations. Command in the operating forces is not divided into components specified in General Order No. 19; however, commands of the operating forces which control activities of the Shore Establishment exercise that control in accordance with these four components.

*Technical Control* is the specialized or professional guidance or direction exercised by an authority of the Naval Establishment in technical matters.

Technical control is exercised by the bureaus and offices of the Navy Department according to their specialized technical responsibilities. This control extends throughout the Naval Establishment.

**SUMMARY:** This chapter has described the current organization of the Department of the Navy, showing where it fits in the Organization for National Security and in the Department of Defense. In doing so, the "overview" type of approach has been emphasized and considerable space has been devoted to organization and functions of the "headquarters units" which constitute the Navy Department at the seat of the Government in Washington, D. C. The other chapters of this book describe in as much detail as possible the organization, the equipment, the management, and the operations of the parts of the Naval Establishment which have been so briefly treated in this chapter under the titles of Shore Establishment and Operating Forces.

## CONSTRUCTION OF SHIPS

## CHAPTER 10

## CONSTRUCTION OF SHIPS

## PRELIMINARY STEPS

## Factors in Naval Construction

In the construction of any ship, major factors to be considered are armament, protection, seaworthiness, stability, maneuverability, speed, and cruising range.

*Armament* is the gage by which the offensive power of the ship is measured. Armament includes main battery guns, secondary battery guns, anti-aircraft guns (secondary battery and heavy AA guns may be combined by employing double-purpose guns), torpedoes, depth charges, and such planes as may be used for torpedo attacks, bombing, or strafing.

*Protection* comprises those features which are provided to thwart or minimize the effects of enemy fire. Included in this category are such protective installations as horizontal and vertical armor, and internal subdivision by longitudinal (found in large ships only) and transverse bulkheads for limiting the spread of flooding caused by damage. Torpedo defense systems are also found in large ships.

*Seaworthiness* is the term used to describe a ship's ability to operate in all kinds of wind, weather, and seas. Stability, size, and freeboard are controlling factors. *Stability* concerns the ability of the vessel to return to an upright position when heeled over by an external force. This is a partial measure of the ship's ability to absorb punishment involving underwater damage and flooding. In addition, stability has an important influence on the period of roll which, to some extent, determines a vessel's utility as a gun platform.

*Maneuverability* is the characteristic which permits rapid changes of course and speed and includes the ability to turn in a small diameter.

*Speed* is determined by the shape of the ship underwater and the power and efficiency of the propelling plant.

*Cruising range* has reference to the ability to remain at sea for long periods of time and traverse long distances. It is determined by fuel capacity, fresh water capacity, evaporator capacity, efficiency of the propelling plant with respect to fuel consumption, and provision capacity (dependent on storage space and refrigeration).

Obviously these qualities are not independent of each other. For example, a change in speed requirements will affect considerably the cruising range. Heavier armor will reduce the proportion of weight which can be used for machinery, and will tend to reduce the potential speed of the ship. The designer of every ship tries to incorporate as many favorable features as possible, in keeping with the general use to which the particular ship will be put. Battleships, aircraft carriers, cruisers, and destroyers all represent a compromise in which some factors must dominate others. Destroyers, for example, sacrifice armor for speed. Submarines, highly specialized, sacrifice a number of qualities essential for surface vessels. Modern high-speed battleships and aircraft carriers represent the nearest approach to the ideal combination of characteristics necessary for surface warships.

## Design

Article 0445 of *Navy Regulations* states, that, except as otherwise prescribed, the Bureau of Ships is responsible for the design, procurement and construction of the service craft of the Navy. The same article, moreover, states that new

## NAVAL ORIENTATION

designs, as requested by CNO and approved by SecNav, will be developed by BuShips in consultation with other bureaus and offices. Such consultation will include all matters affecting the required military and functional characteristics, structural strength and seaworthiness of the proposed vessels.

Using the general requirements as a guide, naval architects in the Preliminary Design Section of the Bureau of Ships determine the displacement, principal dimensions, form, and interior arrangement of the vessel. The strength, stability, and resistance to damage are also studied at this time. The design of any naval vessel is an infinitely complex work. As has been noted, it involves the balancing of many factors. The architects begin with a series of design studies, each of which is a complete preliminary design, differing from the others in the type of compromise effected among the various requirements. Sometimes as many as twenty of these studies are made before one is finally selected.

This study then goes to the Hull and Machinery Design Sections where larger-scale and more detailed contract plans are drawn. At this stage the detail features of the design are developed and many details worked out which were not included in the preliminary study. Large-scale, detailed working plans are then drawn, often in the shipyard where the vessel is to be built.

#### The Plans

The first step in the construction of a ship is, of course, the drawing of the working plans, generally constructed to a scale of one-quarter inch or one-half inch to the foot. From these a full-scale set of plans is made in the mold loft. The full-scale plans are actually laid off on the mold-loft floor and from them thin wooden or hard paper *templates* (patterns) are cut for each plate and structural member necessary. The templates are taken to the prefabricating shop where the steel plates and structural shapes are cut and numbered for identification purposes.

### BASIC STRUCTURE OF A SHIP

#### The Plating

A ship is structurally a box girder. *Shell plating* forms the sides and bottom of this box girder and the weather deck forms the top. The point where the weather deck and the *side plating* meet is called the *deck-edge* or *gunwale*. The location where the *bottom plating* and the side plating meet is called the *bilge*. Usually the bottom is rounded into the side of the vessel to some degree and this rounding is called the bilge of the vessel.

Most merchant vessels and battleships have a box-like section, with vertical sides and a flat bottom like a rowboat. High-speed vessels such as destroyers and cruisers, however, have rising bottoms and broad rounded bilges.

The individual shell plates are generally rectangular in shape, the short sides being called the *ends* and the long sides being called the *edges*. End joints are known as *butts* and edge joints are called *seams*. The plates are joined together at the butts to form long strips of plating running lengthwise. These fore-and-aft rows of plating are called *strakes*. The strakes are lettered from the *keel* outward, around the

turn of the bilge and up to the gunwale. The strake next to the keel on each side is called the *A-strake*. (In the days of wooden ships this strake was known as the *garboard strake* but this term no longer has much meaning.) The uppermost side strake, at the gunwale, is called the *sheer strake*. This strake is an important structural member of the ship and is much thicker than most of the other strakes. The shell plating, together with the weather deck, forms the watertight envelope of the vessel (its main purpose to exclude water from the interior). It also is a major contributor to the strength of the hull structure—a capacity enhanced by the internal structural members of the hull.

#### The Keel

The most important structural member of a ship is the *keel*. The keel is an internal structure running the length of the vessel's bottom from the *stem* to the *stern frame*. It acts as a backbone, performing a function similar to that of the human spine. The keel does not project below the bottom of a vessel as does the *fin keel* of a sailboat, but lies entirely within the ship.

## CONSTRUCTION OF SHIPS

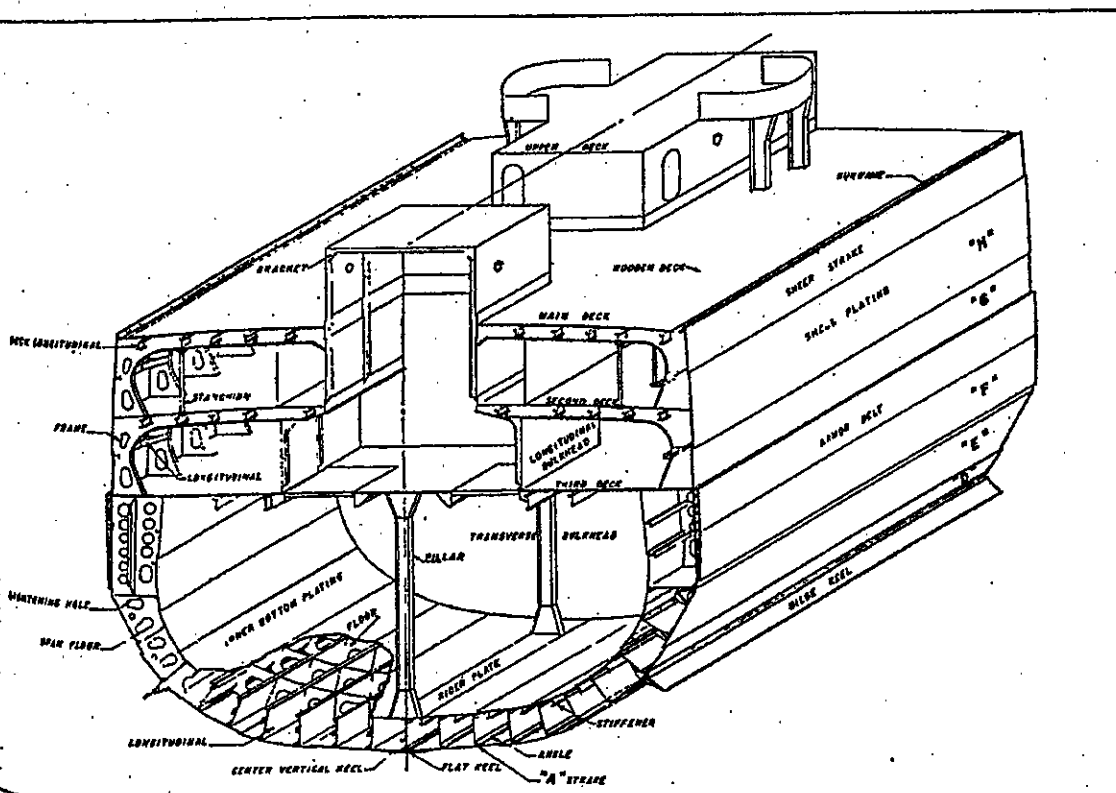
is built up of plates and angles into an I-beam shape. The lower flange of this I-beam structure is the flat plate keel which forms the center keel of the bottom plating. The web of the beam is known as the center vertical keel. The height of this center vertical keel varies from about 1 foot in small vessels to nearly seven feet in large vessels. The upper flange of the beam is called the rider plate. If the vessel is fitted with an inner bottom, the rider plate forms the center strake of the inner bottom plating. At the ends of the vessel the keel is joined to two heavy castings (the stem and stern frame) which complete the backbone.

the framing

The shell plating is assisted in resisting the pressure of water, wind, and wave by two sets of stiffening members called frames. One set of frames, known as transverse frames, extends

from the keel outward around the turn of the bilge and up the sides like the ribs of a human skeleton. They are closely spaced along the length of the ship and define the form of the vessel. The other set of frames is called longitudinal frames or, more often, simply longitudinal. These structural shapes run parallel to the keel along the bottom, bilge, and side plating, and tie the transverse frames and bulkheads together along the length of the ship.

Where the two sets of frames intersect, one set must be cut to make way for the other. Those which are not cut are known as continuous frames, while those which are cut (and thus weakened) are known as intercostal frames. This gives rise to two important ways of building a ship. One method is to make the transverse rib-like frames continuous and make the longitudinal intercostal between them. In this method the transverse frames are spaced about



STRUCTURE OF A CRUISER

Detailed drawings of inner structure of naval ships generally are highly classified.



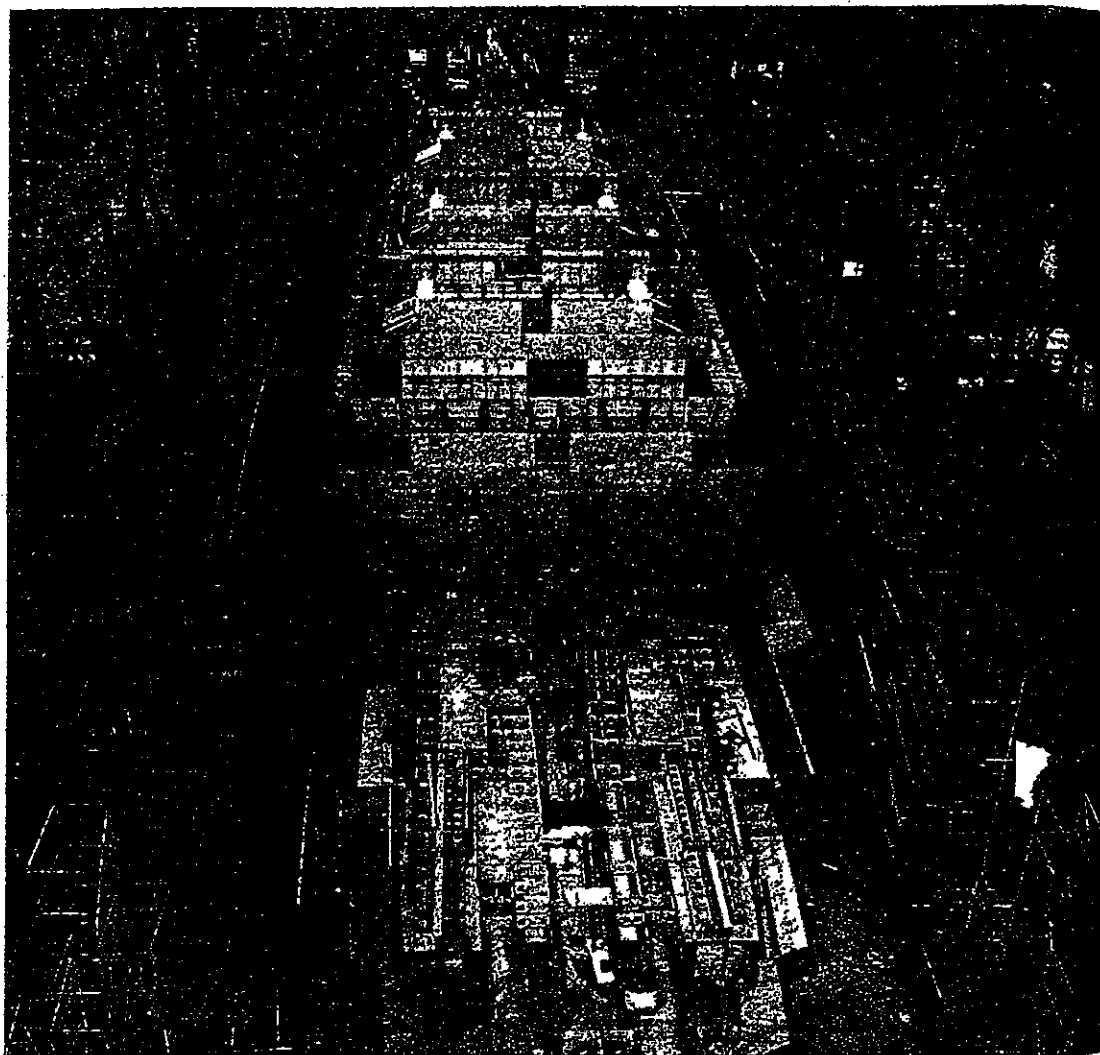
## NAVAL ORIENTATION

every two feet along the length of the ship, while the intercostal longitudinals are relatively few. Most merchant cargo vessels and wooden vessels are built in this fashion and they are known as *transversely framed* vessels. The alternate method is to allow the longitudinals to remain continuous along the length of the ship and make the transverse ribs intercostal between them. The longitudinals are quite numerous, but the transverse frames are spaced farther apart. Most naval vessels are built in this fashion and are known as *longitudinally*

*framed* vessels. While it is a more difficult method of construction, vessels so built are stronger than those that are transversely framed. Transverse frames are usually numbered consecutively from bow to stern. Longitudinal frames are numbered from keel to gunwale.

#### Inner Bottom and Torpedo Protection

The two sets of stiffening frames, *transverse* and *longitudinals*, criss-cross each other like grating. When the frames are designed as deck plate members, like the keel, they form a



A BATTLESHIP IS BORN

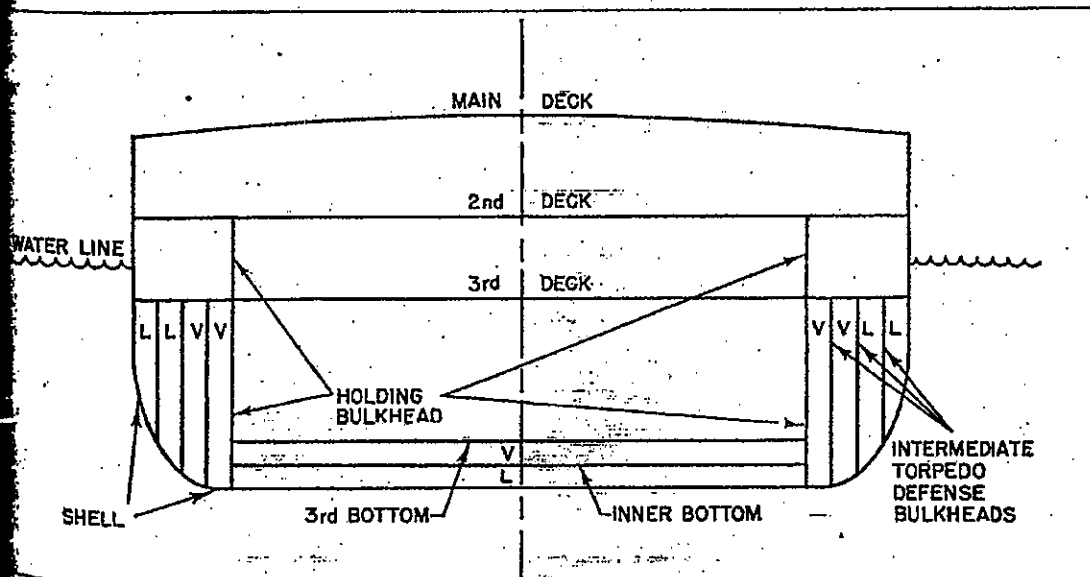
View of USS Illinois (BB65) from stern looking forward, at the Philadelphia Naval Shipyard.

# CONSTRUCTION OF SHIPS

ult in a framework similar to a honeycomb. This method of designing the bottoms is called *cellular construction*. The transverse frames are called *transverse frames* and the longitudinal frames are still called *longitudinals*. On vessels larger than destroyers, the cellular double bottom is usually covered by a layer of watertight plating called the *inner bottom* or *tank top*. This inner bottom provides a barrier against flooding, in the event that the outer bottom is ruptured by grounding, etc. It contributes greatly to the strength of the hull and encloses the cellular double bottoms in a series of tanks in which are carried fuel, fresh water, and ballast. Each tank is composed of several of the cells of the double bottom. The floors which form the partitions of the tanks are watertight or oiltight and are called *transverse floors*. The floors within the tank have holes (called *lightening holes*) cut in them to save weight and to allow access to various parts of the tank. Such floors are called *open floors*. This system of *outer bottom* (or *shell*), *inner bottom* plating, and cellular double bottom results in a tremendously strong structure.

The double bottoms in a merchant-type vessel extend across the bottom of the vessel from bilge to bilge. The inner bottom or tank top is flat and acts as the bottom of the cargo holds. Destroyers and smaller vessels do not usually have two bottoms. Cruisers have an extensive double bottom system which extends from the keel around the bilge and up the side to above the waterline. Battleships and large aircraft carriers have the most extensive systems afloat. Many battleships have triple bottoms to protect the vessel from mine explosions under the vessel. The double bottom systems along the sides have grown into complicated torpedo protection systems having from four to seven layers of cells.

The illustration shows one type of torpedo protection system which has been developed as a result of extensive research, experimentation, tests and practical experience with heavy ships hit by torpedoes. (Note: L-liquid; V-void.) The inboard bulkhead is called the *holding bulkhead*; it is expected to withstand damage and deflection without leakage, even though bulkheads outboard of it are ruptured. The holding bulkhead extends from the shell at the bottom of the



TORPEDO PROTECTION SYSTEM

This drawing illustrates the principle involved in the torpedo protection system used in some large naval vessels.



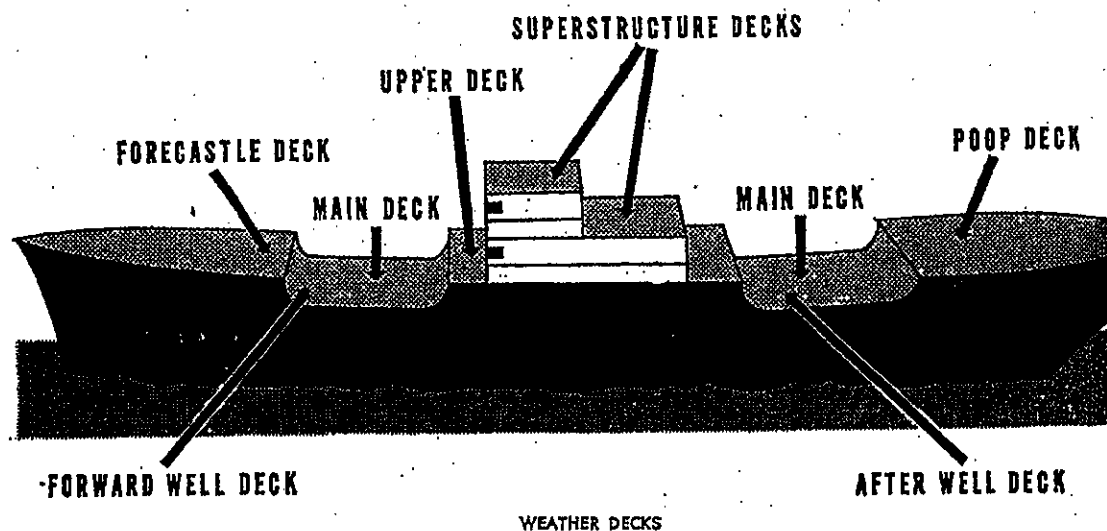
## NAVAL ORIENTATION CONSTRUCTION

ship to the third deck. A lighter bulkhead continues upward to the second deck, one deck height higher than the other protective bulkheads.

When an explosion takes place, the shell is ruptured with great force. As the distance into the ship increases, the destruction of structure diminishes. The intent of the design is to construct the system so that each of the torpedo defense bulkheads will stretch as far as possible, and absorb a maximum of the energy of the explosion before letting go. This so weakens the effect of the explosion that by the time the re-

## Bulkheads

The interior of the vessel is divided into compartments by vertical walls called bulkheads. Bulkheads are either watertight *structural bulkheads* or merely partitions or *joiner bulkheads*. Structural bulkheads give the ship contour, shape, rigidity, and strength. They serve to divide the ship into numerous *watertight compartments* or rooms. They may be transverse bulkheads, extending athwartships, or longitudinal bulkheads, extending fore and aft. They not only subdivide the ship but serve to tie the shell plating, framing, and decks together.



maining force reacts upon the holding bulkhead, the latter is strong enough to withstand the resulting distortion without failure. Thus, flooding of the vital inboard spaces is prevented (although wing voids may flood over a considerable length).

At the same time, it is necessary to suppress fragmentation and flash. Experience has proved that one deep layer of liquid, either oil or water (several feet in transverse depth), or two shallower layers of liquid somewhere in the system, are required to prevent large fragments of shell plating and other material from causing fragment damage to interior bulkheads and extension of flooding.

rigid structure. Transverse bulkheads are numbered to correspond with the transverse frames which they replace.

## Decks

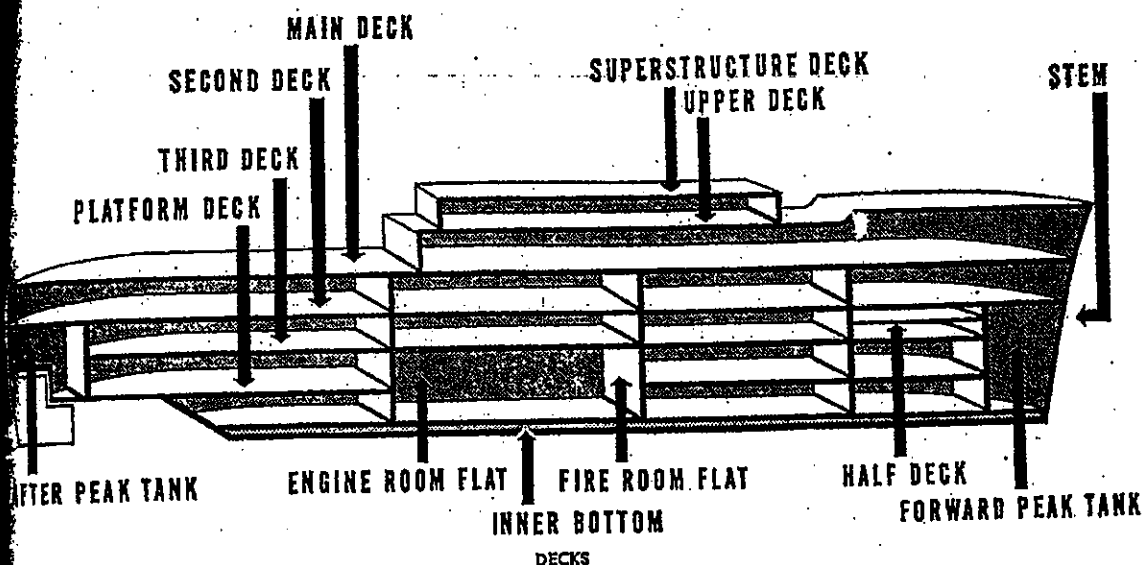
The ship is divided horizontally by a series of *decks and platforms* into tiers of compartments, the decks forming the floors and ceilings of the compartments (the bulkheads forming the walls). The floor of a ship's compartment is always called the *deck* and the ceiling is always called the *overhead*. This is because the words "floor" and "ceiling" have other meanings on board ship. As we have already noted, a floor is a transverse partition in the dock-

PLATFORM

PEAK T

rooms. The ceiling is the overhead which is joined to the deck by plating, and are important structural plating is longitudinal and outside of the hull usually consists of transverse bulkheads. They are usually of triangular shape and is usually provides insulation for the decks and is so that the arch, ceiling and deck is in the position in the stem of the ship. Decimals are called pa

## CONSTRUCTION OF SHIPS



bottoms. The *ceiling* is a wood sheathing in the cargo hold and is used to protect the cargo from damage which might result if it were to strike against the steel structure of the vessel.

The deck is composed of rectangular steel plates joined into strakes similar to the shell plating. The plates in the outermost strake of deck plating, which are called the *stringer* plates and are connected to the shell plating, are important structural members in the ship. The deck plating is strengthened by transverse and longitudinal *deck beams* and *deck girders* on the underside of the deck. These beams and girders are usually composed of I-beams or channel beams. They are fastened to the shell frames by means of triangular steel *brackets*. The weather deck is usually covered by a wooden deck which provides insulation to below-deck spaces and offers safer footing to the crew in wet weather. The decks above the waterline are usually arched so that they are higher at the centerline. This arch, called *camber*, provides greater strength and aids in the drainage of water. A deck is named in two ways: first, by its position in the ship and, second, by its use or function. Decks extending from side to side and from stem to stern are *complete decks*; decks occurring only in certain portions of the vessel are called *partial decks*. The uppermost com-

plete deck is called the *main deck*. The complete decks below this are called the second deck, third deck, etc., normally being numbered downward. Partial decks which occur in only one portion of the ship have special names such as:

a. *Forecastle deck*: a partial deck above the main deck at the bow.

b. *Half deck*: a partial deck below the main deck but above the lowest complete deck.

c. *Upper deck*: a partial deck above the main deck amidships. It is part of the superstructure unless the side plating is carried up to its level. (Additional decks above this in the superstructure are usually named for their use, as: *communication deck*, *signal bridge*, or *navigating bridge*.)

d. *Poop deck*: a partial deck above the main deck in the stern, usually only in merchant ships.

Partial decks which occur below the lowest complete deck are called *platforms*. These are numbered downward, as first platform, second platform, etc. The inner bottom is usually called the *hold*. Miscellaneous working platforms or flats consisting of gratings are located in the machinery spaces to aid in the operation of the ship's engines.

In addition to the above nomenclature, some decks are known by names describing their use

## NAVAL ORIENTATION CONSTRUCT

or function. The deck which carries heavy plating to resist enemy projectiles or bombs is called the *protective deck* or *armor deck*. A subsidiary protective deck is sometimes installed. It has

light armor plating and is located just below the armor deck to protect the below-deck spaces against fragments. This deck is known as the *splinter deck*.

## COMPARTMENTATION

## Dual Purpose

As we have seen, the decks and bulkheads of a vessel divide the interior into many watertight rooms or *compartments*. In a cargo vessel there are few decks and the bulkheads are widely spaced. The resulting compartments are designated by their primary purpose, such as *cargo holds*, which are large enough to accommodate, in some cases, many tons of cargo. Passenger vessels have smaller holds, the remainder of the space being divided by decks and bulkheads into smaller living compartments for passengers. Naval vessels are more extensively compartmented than merchant vessels as a whole. This is because their watertight compartmentation is more than a matter of dividing or segregating the various activities aboard a ship. The ability of a naval vessel to withstand damage depends largely upon its compartmentation. In case of damage, the watertight boundaries of the compartments restrict flood waters and stand as a barrier between them and the undamaged portion of the vessel. Extensive compartmentation lessens the amount of sea water which will enter the vessel through a rupture in its shell plating. In naval vessels this compartmentation reaches its highest development in the battleship, which of all men-of-war is capable of taking the most punishment.

## Watertight Integrity

In the previous paragraph only watertight compartments were discussed. If a compartment is not watertight, its usefulness as a barrier to flooding of the vessel is nil. The quality of watertightness is known as *watertight integrity*. The higher the watertight integrity of a compartment, the more effectively it limits flooding. Low watertight integrity may be useless. The battle to maintain the watertight integrity of the ship as a whole is a complicated and never-ceasing one. The waking hours of a considerable number of any warship's crew are

concerned in one way or another with the ceaseless patrol and inspection necessary to keep the watertight integrity high and the vessel in battle trim.

Boundaries of each watertight compartment are pierced by doors and hatches. Also by countless holes to accommodate water, steam, oil and air piping, electric cables, ventilation ducts and other necessary utilities. Each hole is plugged by a *stuffing tube*, *pipe spool*, or other device to prevent water from leaking in around piping and cables. Piping and ventilation ducts are equipped with cutoff valves or other closures at each main bulkhead, so that they can be closed off if ruptured. Rigid restrictions against opening watertight doors or hatches during action or in dangerous waters are enforced. All of these "defensive" precautions must be taken to insure the full use of the fighting qualities of the vessel.

## Compartment Numbering in Ships Constructed Before March 1949

United States naval vessels constructed before March 1949 are divided, from forward aft, into three divisions labelled A, B, and C. Division A extends from the stem to the forward transverse bulkhead of the forward machinery compartment. Division B includes the space from the bulkhead to the after bulkhead of the after machinery compartment. Division C comprises the remaining space aft. Note that while the ship is considered to have only three main divisions, this does not mean that there are only three transverse bulkheads. There are many others all supporting the structure of the vessel and contributing to its compartmentation and watertight integrity.

In ships built before March 1949, compartments are designated by various letters and

numbers to example, a division in The first shows what compartments are used on the star

As a gen deck are n sion begin sion. Comp be in the tv deck in the superstruc 901 to 999 ments. Cor same nume cated by th division let

To defin ment, the n nating lette stands for and their n

M—amm  
E—mach  
W—water  
F—fuel  
V—void  
B—guns  
A—store  
C—ships

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## AL ORIENTATION CONSTRUCTION OF SHIPS

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ities of the vessel

As a general rule, compartments on the main  
deck are numbered from 101 to 199 in each divi-  
sion. Compartments on the second deck would  
be in the two hundred series, those on the third  
deck in the three hundred series, those on the  
superstructure deck from 001 to 099. The series  
001 to 999 is used for double-bottom compart-  
ments. Compartments on half decks have the  
same numeral as the deck below but are indi-  
cated by the letter H which is added after the  
division letter; i.e., BH-215-L.

To define the contents or use of a compart-  
ment, the numeral group is followed by a desig-  
nating letter. In the example cited, the letter L  
stands for living quarters. Other letters used  
and their meanings are as follows:

### Ships Constructed

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rious letters an

M—ammunition

E—machinery

W—water

F—fuel

V—void

B—guns

A—storeroom

C—shipcontrol

For compartments extending from the inner  
bottom up through two or more decks, the desig-  
nation is the division letter followed by a num-  
ber in the series 1 to 100. Examples of compart-  
ments of this type would be the engine room,  
storeroom, peak tank, or cargo hold. Thus a boiler  
room might have the designation B-1 or C-1.

Every door, hatch, manhole, or other means  
of ingress to a compartment has a metal label  
on it which gives the door's number and loca-  
tion, plus a description of what is in the com-  
partment, and the compartment's letter and

numeral designation just discussed. For ex-  
ample:

W. T. D. 4-16-6  
C. P. O. Stores  
A-412-A

W.T.D. stands for watertight door. The "4"  
indicates that it is on the fourth deck, the "16"  
that it is just abaft the sixteenth frame, and  
the "6" that it is the third opening, from in-  
board out, on the port side. You would also  
know that the compartment was a storeroom  
for C.P.O.'s located in Division A and that it  
was the sixth compartment on the port side  
from the bow.

### Compartment Numbering in Ships Constructed After March 1949

Compartment numbers contain the following  
information in the order given and each part is  
separated by a hyphen: deck number; frame  
number; relation to centerline of ship; usage of  
compartment. The number assigned to a com-  
partment is determined as follows:

**Deck Number.** The main deck is always num-  
bered 1. The first deck or horizontal division  
below the main deck is numbered 2; the second  
below, numbered 3, etc., consecutively for sub-  
sequent lower division boundaries. Where a  
compartment extends down to the shell of the  
ship, the number assigned the bottom compar-  
ments is used. The first horizontal division  
above the main deck is numbered 01; the second  
above, numbered 02, etc., consecutively for sub-  
sequent upper divisions. The deck number estab-  
lished as above becomes the first part of the  
compartment number and indicates the vertical  
position within the ship.

**Frame Number.** The frame number at the  
foremost bulkhead of the enclosing boundary of  
a compartment is its frame location number.  
Where these forward boundaries are between  
frames, the frame number aft is used. Frac-  
tional numbers are not used. The frame number  
is the second part of the compartment number.

**Relation to Centerline of Ship.** Compartments  
located so that the centerline of the ship passes  
through them carry the number 0. Compart-



## NAVAL ORIENTATION

ments located completely to the starboard of the centerline are given odd numbers and those completely to the port of centerline are given even numbers. Where two or more compartments have the same deck and frame number and are entirely starboard or entirely port of centerline, they have consecutively higher odd or even numbers, as the case may be, numbering from the centerline outboard. In this case, the first compartment outboard of the centerline to starboard will be 1; the second, 3, etc. Similarly, the first compartment outboard of the centerline to the port will be 2; the second 4, etc.

**Compartment Usage.** The fourth and last part of the compartment number is a capital letter which identifies the assigned primary usage of the compartment. Secondary usages are not considered and only a single capital letter assignment is made, except that on dry and liquid cargo ships a double letter identification is used to designate compartments assigned to cargo carrying. The letters are assigned in accordance with the following applicable categories:

**A** for stowage spaces such as:

Storerooms	Refrigerated compartments
------------	---------------------------

Issue rooms

**AA** for spaces such as cargo holds and cargo refrigerated compartments.

**C** for vital ship and fire control operating spaces which are normally manned such as:

Plotting rooms	Radio, Radar, and Sonar operating spaces
----------------	--

CIC	Main communication
Interior communication	Pilot house

**E** for engineering spaces which are normally manned, such as:

Main propulsion spaces	Pump rooms
Boiler rooms	Generator rooms
Evaporator rooms	Switchboard rooms
Steering gear rooms	Windlass rooms
Auxiliary rooms	

**F** for fuel oil, lubricating oil, and fog oil compartments, such as:

Fuel oil compartments	Lubricating oil storage tanks	(a)
-----------------------	-------------------------------	-----

Diesel oil compartments	Fog oil compartments	(b)
-------------------------	----------------------	-----

**FF** for such compartments if used for cargo

**G** for gasoline compartments, such as:

Gasoline stowage tanks	Gasoline tank cofferdams, trunks and pump rooms	(c)
------------------------	---	-----

Gasoline tank compartments

**GG** for such compartments if used for cargo

**K** for spaces for stowage of chemicals, semi-safe and dangerous materials, as listed in article 30-1 (2) and 30-1 (3) *Bureau of Ships Manual*, except that oil and gasoline compartments bear the letters F and G, respectively.

**L** for living spaces such as:

Berthing spaces	Washrooms and water closets
-----------------	-----------------------------

Messing spaces	Hospital spaces
Prisons	Passageways

Staterooms

**M** for ammunition spaces, such as:

Magazines	Shell rooms
Handling rooms	Ready service rooms
Turrets and gun mounts	Clipping rooms

**Q** for all spaces not otherwise covered in category herein, such as:

Shops	Engineering, electrical and electronic spaces which are normally manned.
Offices	
Laundry	
Galley	
Pantries	

**T** for vertical access trunks.

**V** for void compartments, such as:

Cofferdam compartments other than gasoline tank cofferdams	Void wing compartments
	Wiring trunks

**W** for water compartments, such as:

Drainage tanks	Peak tanks
Fresh water tanks	Reserve feed tanks

The application of the above principles is illustrated by the following example:

3-75-4-M

## NAVAL ORIENTATION INSTRUCTION OF SHIPS

indicating oil storage  
 oil compartments  
 if used for cargo  
 tanks, such as:  
 line tank coffers  
 tanks, trunks and  
 pump rooms

if used for cargo  
 of chemicals, see  
 as listed in article  
 of Ships Manual  
 compartments be  
 rely.

bathrooms and wash  
 closets  
 vital spaces  
 passageways

such as:  
 living rooms  
 dining service rooms  
 sleeping rooms

otherwise covered by

engineering, electric  
 and electronic  
 spaces which are  
 normally manned

s.

such as:  
 living wing compart  
 ments  
 living trunks

), such as:  
 fuel tanks  
 reserve feed tanks  
 above principles  
 example:

- (a) 3 indicates that the compartment is on the third deck.
- (b) 75 indicates that its forward boundary is on or immediately forward of frame 75.
- (c) 4 indicates that it is the second compart-

ment outboard of the centerline to port on the third deck with the forward boundary at or immediately forward of frame 75.

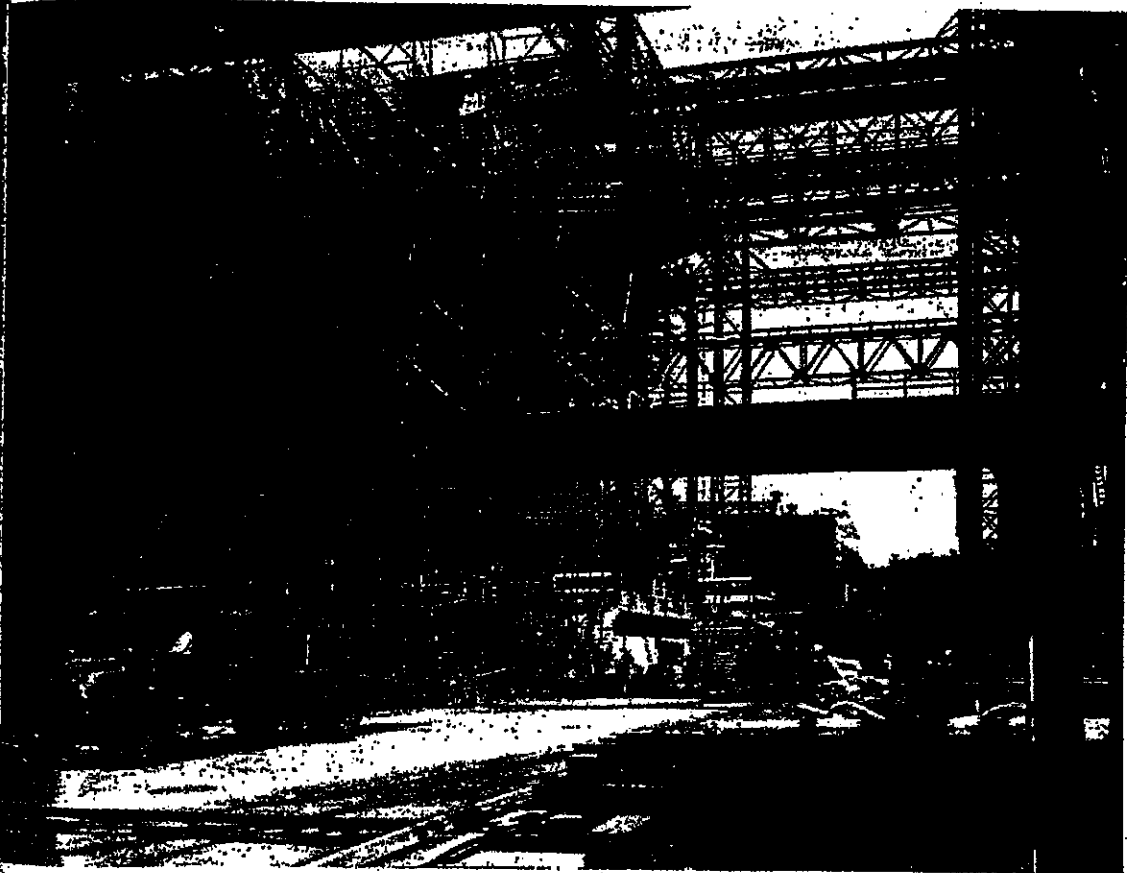
- (d) M indicates that it is an ammunition compartment.

## SHIPBUILDING PROCEDURE

### The Ways

The procedure followed in building a ship varies widely, depending on the type of ship, by whom it is built, and whether it is predominately of riveted or of welded construction. In general, however, the primary operations are similar. The ship normally is built on a sloping concrete platform called a *way*. The slope of the

way is called its *declivity*. The way is sloped so that when the ship is launched it will slide into the water under its own weight. A row of building blocks is placed down the center of the way upon which the keel is erected. These blocks are high enough so that workmen can work under the hull while the ship is being built. A wooden *cradle*, shaped in the form of the shell of the



BUILDING WAYS AT A NAVAL SHIPYARD

Naval shipyards, formerly called navy yards, were the first units of the Shore Establishment to come into being. During a war, much naval ship construction is done at private building yards, leaving the naval shipyards free to perform repairs on war-damaged ships.



## NAVAL ORIENTATION CONSTRUCTION OF

ship from the keel to around the turn of the bilge, is then erected on either side of the building blocks. *Bilge cribs* are placed along the bilge at intervals to support the weight of the sides as the vessel is built. As the hull is erected, scaffolding is raised along the sides to facilitate construction.

#### Subassembly Bays

The modern practice is to assemble rather large portions of the ship in subassembly bays located some distance from the ways. At one point, all the bulkheads are constructed, complete with stiffeners and other fittings. At other bays, whole sections of the side plating with frames attached are welded. Complete sections of double bottoms, consisting of shell plating, transverse floors, longitudinals, and inner bottom, equipped with piping and valves for the tanks and other fittings, are assembled at other points. Large gantry or "whirly" cranes carry these subassemblies, some of which weigh as much as 50 tons, to the way where they are joined to the ship.

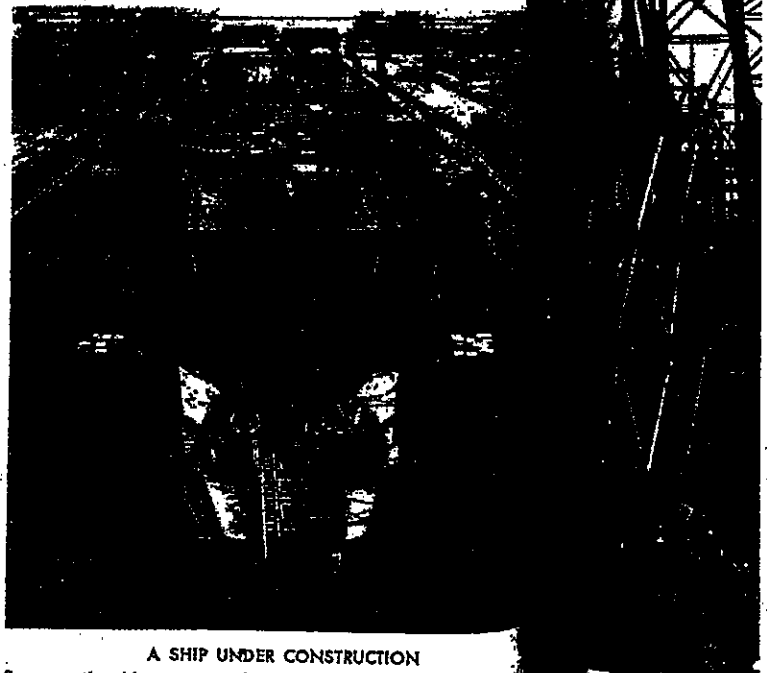
#### Erecting the Ship

There are various sequences used in erecting a ship, depending upon the type and size of the ship, the type of construction (riveted or welded), and facilities for subassembly. However, there are certain basic principles which must be adhered to. The following is a typical example of modern practice.

The fundamental precept for erecting both subassemblies and the ship as a whole is to work from the center, progressing from inboard to outboard and simultaneously forward and aft. The first operation in building a ship is placing the flat and vertical keel sections on the building blocks and connecting the butts either by riveting or by welding. Next, the double bottom sections are placed on each side of the keel, starting amidships and working forward and aft. The double bottom sections are jacked into position and welded or riveted to the keel. As soon as the double bottoms are in place, the main transverse strength bulkheads are erected in place. Generally, some longitudinal deck girders and longitudinal bulkheads are then placed to steady the main transverse

bulkheads in a fore-and-aft direction. The side framing and shell plating are now placed in position and fastened to the existing structure. The frames are connected to the double bottom. As soon as the side shell is in place, the deck, beginning with the lowest, are installed. The deck is connected to the shell frames and to the transverse and longitudinal bulkheads.

If the vessel is to be armored against gunfire and bombs, the armor must be *worked into* the ship as the construction progresses. In vessels having light armored decks, such as cruisers, the deck is merely thickened and composed of armor plate. The heavy deck armor of a battleship, however, is placed on the ordinary steel deck. Since its great weight prevents it from shifting, it is seldom fastened to the deck plating. The individual armor plates are keyed together to form a cohesive whole. Heavy armor is installed on large naval vessels. It extends from several feet above to several feet below the waterline. These armor plates are hoisted into position and bolted to the shell plating.



A SHIP UNDER CONSTRUCTION

Scene as the ship grows on the ways at Norfolk Naval Shipyard. A large battleship usually requires about three years from keel-laying to launching. The Missouri's keel was laid on 6 January 1941 and she was launched on 29 January 1944.

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# INSTRUCTION OF SHIPS

The whole armor belt is keyed together

structure. As the building process progresses - from bottom midships toward the ends, the stern frame and deck assembly is erected and the double bottom and side shell are carried aft to join this assembly. The whole bow section is usually constructed at the bow subassembly point and placed in position rather late in the building schedule. The last steps in the pre-launching construction schedule are the installation of propeller shafts and machinery and the painting of the exterior of the vessel. Large vessels are usually from one-half to three-quarters complete when launched.

## Primary stages of lung cancer

Before the keel is laid, launching calculations are undertaken in the drafting room, in order to determine the best position on the ways for the ship.

building the ship, as well as the method of launching and the proper time to launch. Several months before launching, the shipwrights begin the preparation of the launching ways and all the preparatory work required to shift the weight of the vessel from the keel blocks, shores, and cribs to the launching ways.

When the USS *Wisconsin* was launched in 1943, the enormous task required a total of 62 distinct operations beginning more than 24 hours before the ship slid down the ways. The task involved transferring the weight of the huge ship from hundreds of timber shores and keel blocks to the ways. There were two types of ways, fixed and sliding. The *Wisconsin* rode down into the water on four fixed ways, each serving as a track. Mounted atop the fixed ways were the sliding ways, which served much as do runners on a sled. The sliding ways were



### LAUNCHING OF USS IOWA

LAUNCHING OF USS IOWA

## NAVAL ORIENTATION CONSTRU

secured to the ship by temporary fastenings. Months before the launching, the fixed ways were lubricated with nearly 100,000 pounds of heavy grease to ease the big ship on her first trip.

One of the first phases of transferring the *Wisconsin's* weight from the timbers shoring her up to the sliding ways was "wedging up." This consisted of driving scores of long wooden wedges under the ship, at right angles to her, in such a way as to force the sliding ways hard up under the ship and hard down on the fixed ways. Meanwhile, more than a thousand workmen gradually removed the shoring and cribbing in accordance with carefully timed plans made several months earlier.

The *Wisconsin* was now ready to slide down the incline of the fixed ways by her own sheer weight. Holding her back, however, was a series of six mammoth triggers whose upper ends were hooked into the sliding ways. The signal to launch was flashed simultaneously at the sponsor's stand, high above the waiting throng, and in the trigger pit. With the releasing of the triggers, the ship was off. The *Wisconsin* took an estimated 30 seconds to slide into the water.

**Sponsors.** The name of the ship is chosen by the Secretary of the Navy, upon recommendation of the Chief of Naval Personnel. The sponsor for the vessel is designated by the Secretary of the Navy in accordance with naval customs and tradition. In the selection of sponsors for battleships, the governor of the state is usually extended an invitation to nominate a woman to christen the ship. The mayor of a city is customarily extended an invitation to nominate a sponsor for the cruiser named in honor of his city. Aircraft carriers, for the most part, are sponsored by the wives of naval personnel associated with aviation; and submarines, by wives of personnel associated with the submarine service. Sponsors for vessels named in honor of personnel are usually the nearest female relatives of the persons for whom those vessels are named. The commandants of naval districts have been authorized to designate sponsors for some of the smaller vessels built within their districts and to consider among others the wives and daughters of shipyard personnel.

**The Ceremonies.** At the time of the launching the sponsor, and naval officers, officials of shipbuilding companies, and the commandant (or his representative) of the naval district in which the vessel is being built, assemble on a flag-decorated platform erected for the occasion at the bow of the ship. If a battleship is being launched, very often the governor of the state which is honored delivers one of the several addresses. Usually the chaplain of the naval shipyard, or district, is a member of the party and just before the ship is started on her first journey, he offers a prayer for those who are responsible for our Government and the officers and men in our Navy. For the ship's future service, he asks, "May this new vessel of our Navy be guarded by Thy gracious Providence and care. May she bear the sword to bring peace on earth among the Nations. Let her be a terror to those who do evil and a defense to those who do well."

The band plays the national anthem, flags and pennants wave, and as the ship begins to move the sponsor breaks upon her bow a gall wrapped bottle of wine or water, saying, "In the name of the United States and frequently adds, "May success always attend you."

At the launching of several of our aircraft carriers, pigeons were released during the christening ceremonies, and squadrons of airplanes saluted from the sky. Frequently blossoms of the chosen flower of the state honored are showered upon the battleship.

#### Fitting Out

After the christening, the ship slips into the water, gliding slower and slower until she loses almost all motion. Then tugs rush to her side and tow her to a fitting-out pier. Here giant cranes move the heavy machinery into the ship. The superstructure, masts, guns, turrets, and other equipment are installed. Miscellaneous machinery is placed in position. Living quarters, galleys, messing compartments, and other spaces are painted and fitted with furniture and equipment. There are innumerable items that must be installed on board before a ship is pronounced complete and ready for commissioning. Five or six months may elapse between

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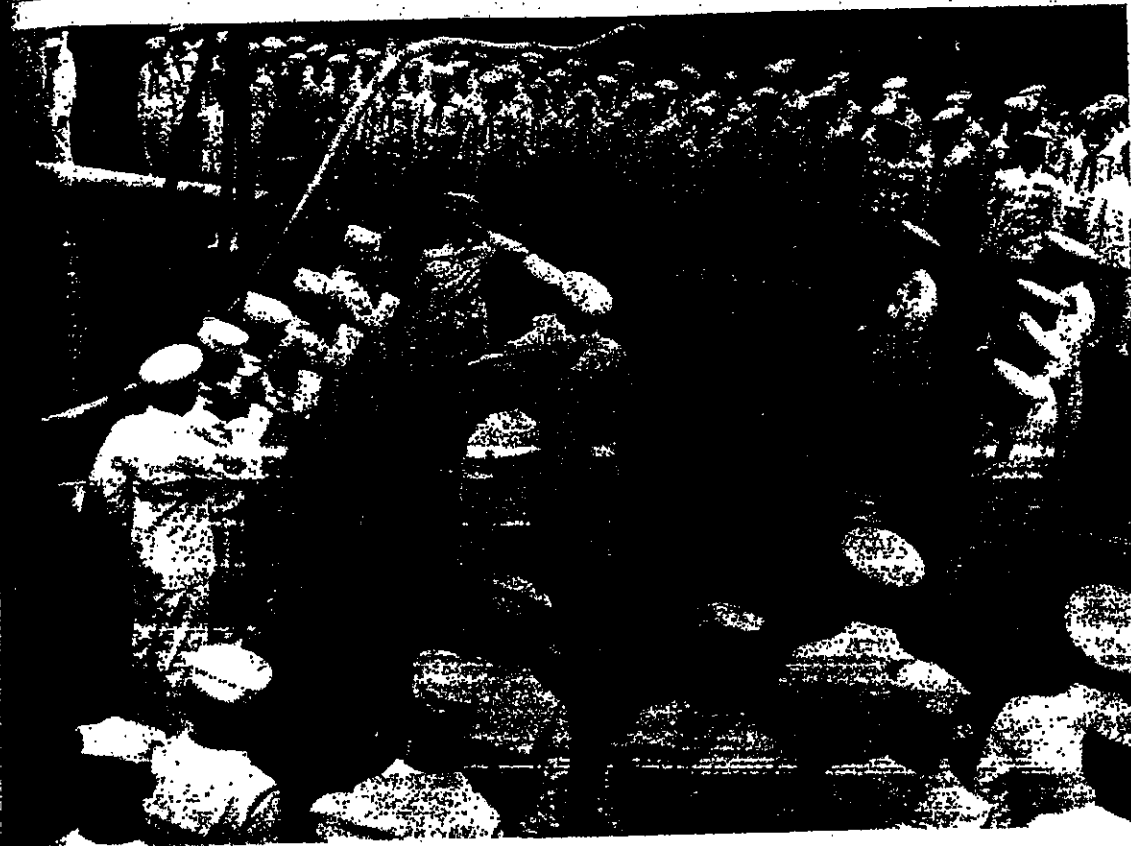
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"BOATSWAIN, SET THE WATCH!"

The cruiser Worcester is commissioned at the Philadelphia Naval Shipyard. First watch is set immediately after the commissioning.

the launching and commissioning of larger ships.

#### Commissioning

When the ship is ready for commissioning, personnel not already on hand, who are to form her crew, are ordered to the local naval shipyard by the Navy Department. Orders are given to the commandant of the naval district, or of the naval shipyard where she is building, to place her in commission.

On the day appointed, her officers and crew in dress uniform assemble on her decks. The commandant and members of his staff are present. While the band plays and all stand at attention, the commandant orders the national ensign hoisted to designate her as a ship in the official

service of the Government. The commission pennant is unfurled at the mainmast.

Then the commandant formally turns the ship over to the prospective commanding officer. The latter reads aloud his orders from the Navy Department to command the ship. His first order is, "Set the watch." The officers and crew take their stations in the new ship.

After a short period of preparation the ship is ready for the shakedown cruise, which will last several weeks. The ship will be tested for seaworthiness, speed, endurance, and ability to maneuver, and her equipment will be adjusted to suit operating conditions. The shakedown cruise is also utilized for training the ship's personnel. Upon completion of this cruise, the ship returns to the outfitting yard for such

## NAVAL ORIENTATION EXTERNA

changes and additions as are found necessary. Most ships built on the east coast then proceed to Rockland, Maine, for standardization trials over the measured mile. These are conducted by the Board of Inspection and Survey. Careful checks are made of the vessel's fuel consump-

tion, speeds, propeller revolutions, and other factors, to set a standard for the service operation. Upon completion of these trials and any additional minor items of work found to be necessary, the vessel is ready to leave the outfitting yard and join the fleet.

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## STANDARD SHIP ORGANIZATION

## CHAPTER 12

## STANDARD SHIP ORGANIZATION

## INTRODUCTION

## Basic Plan of Organization

A warship's complement is composed of such numbers, ranks, and ratings of officers and men as are necessary to fight the ship most efficiently. The ship's organization is essentially a war organization, developed on the theory that ships should operate in peacetime with an organization that can be expanded quickly without basic change when the transition to a wartime operating condition becomes necessary. It is based on a grouping of functions and personnel that is intended to reduce to a minimum both the possible overlapping of responsibility in command and the duplication of personnel.

The ship's organization is published in NWP-10, which is titled *Shipboard Procedures*.

In general, the over-all organization, under the commanding officer and an executive officer, is as follows:

1. There are four major command departments: the operations department, the navigation department, the gunnery (or deck) department, and the engineer department.

2. There are three staff departments: the supply department, the medical department, and the dental department.

3. In aircraft carriers and seaplane tenders there is an additional department—the air department.

4. In repair ships and tenders there is an additional department known as the repair department.

5. In submarine tenders there is a department known as the ordnance repair department. This is in addition to a repair department.

The four major command departments are headed by officers eligible to exercise command, except that an officer designated for engineering duty only (EDO) or aviation engineering duty only (AEDO) may be ordered as the engineering officer.

In aircraft carriers and when practicable in seaplane tenders, the operations and air departments are each headed by a naval aviator.

## Modifications Permitted

*Shipboard Procedures* (NWP-50) serves as a guide for type commanders in preparing detailed administrative and battle organizations for their ships. (A type commander has command of a group of ships of a particular type; for example, Commander Destroyers, Pacific Fleet.) In preparing type organizations the commanders must allow for the missions and other considerations peculiar to the type and also the quality and quantity of personnel available. Consolidation and changes within the framework of the standard ship organization are authorized. However, administrative and battle organizations prepared by corresponding type commanders in different fleets are coordinated through their respective fleet commanders, and are made identical for the same types and classes of ships. The organization described in this chapter is in general that of a large fighting ship.

## COMMANDING OFFICER

## General Responsibilities

The duties, responsibilities, prerogatives, and authority of the commanding officer of a ship are well established by regulations, orders, and customs.

The standard ship organization vests in the commanding officer the responsibility for the performance of his command. *Navy Regulations* places many specific responsibilities directly in his hands and makes him solely responsible for



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## THE EXECUTIVE OFFICER

## General Status

The chief assistant to the commanding officer is the executive officer. He is detailed as such by the Secretary of the Navy, from officers of the line (exclusive of those restricted by law to the performance of engineering duties). As the next ranking officer aboard ship, he is the direct representative of the commanding officer in maintaining the military and general efficiency of the ship. The executive officer has no authority independent of the commanding officer, and the details of his duties are regarded as execution of the captain's orders. All heads of departments and other officers and enlisted men are under the executive officer's orders in all matters pertaining to operation and maintenance

of the ship and to preservation of order and discipline on board.

## Duties and Responsibilities

Responsibility for the personnel and for the ship's routine, efficiency, and discipline lies mainly with the executive officer. Specifically the current ship's organization lists the following administrative functions which apply to the ship as a whole:

1. Coordination and supervision of all departments
2. Morale, welfare, and discipline
3. Assignment and records of personnel
4. Religious matters



THE CHAPLAIN IS THE SPIRITUAL AND MORAL COUNSELLOR  
In the ship's organization, the chaplain is an assistant to the executive officer.

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## STANDARD SHIP ORGANIZATION



POST OFFICE Afloat

Importance of mail as a factor in morale has long been recognized by the United States Navy. Outgoing mail is being sorted in this scene in the mail room of USS Wisconsin.

- Preparation and maintenance of bills and orders
- Supervision and coordination of work, exercises, and training
- Supervision of loading and berthing plans
- Supervision of ship's correspondence
- Training and education of the ship's com-

### Legal matters

The executive officer is required to be familiar with every part of the ship. With the assistance of the heads of departments he arranges and coordinates all ship's work, drills and exercises, personnel organization, policing of the ship,

and inspections of the ship. He is charged with the maintenance of cleanliness, good order, efficiency, and the trim appearance of ship and crew. When on board ship, the executive officer is always on duty.

The executive officer keeps in close touch with all the activities of the ship and supervises the heads of departments in the performance of their duties, including the instruction of junior officers. In small ships, he may perform the duties of navigator.

The executive officer supervises the entries in the crew's Service Records and is responsible for their accuracy. Matters involving discipline

## ORIENTATION STANDARD SHIP ORGANIZATION

### MEDICAL AND DENTAL DEPARTMENTS

#### Introduction

The medical and dental departments are established aboard combatant ships as well as aboard noncombatant vessels. In small ships these two departments may be combined, or they may be nonexistent.

#### Medical Officer

The head of the medical department is the medical officer. He is normally the senior officer of the Medical Corps attached to and serving on board a ship. He is directly responsible, under the commanding officer, for maintaining the health of the personnel of the command, and

he must make the necessary inspections to insure it. He also acts in an advisory capacity to the commanding officer in matters pertaining to sanitation and hygiene.

Not only must the medical officer furnish medical care and treatment to the ship's personnel, but he must, when directed by the captain, provide these services to other members of the United States Armed Forces who may require them.

When circumstances require, he cooperates with local health authorities in matters affecting the health of the community. He assists these authorities in quarantine inspections, and also advises the commanding officer regarding

his assistants directed by the operation and they may be batteries, or on the

ships to which the members of the Surgeon's Department, disbursing, or one of the as the assistant responsible for maintaining the ship's equipment in connection with the ship.



FOOD INSPECTION

The medical officer's duties include inspection of food served to the ship's company. Prevention of illness is one of his most important missions.



## NAVAL ORIENT

the medical aspects of pertinent quarantine regulations.

Although the supply officer receives, delivers, and ships medical and dental supplies, the medical officer is charged with procuring, inspecting, stowing, issuing, and transferring of medical supplies. (Dental supplies are similarly handled by the dental officer.)

In addition to performing the usual instructional responsibilities of department heads, the medical officer must insure that all ship's personnel are adequately trained in administering first aid.

He works in close cooperation with the dental officer. If, in the course of a physical examination, he notes dental conditions that need attention, he refers such matters to the dental officer.

The medical officer is stationed in battle where he can best serve and supervise attendance on the wounded.

#### Dental Officer

In ships that have a dental department the senior officer of the Dental Corps attached to the ship is the department head. He is directly responsible to the commanding officer for all professional, technical, and administrative matters connected with dental services. He and his subordinates may in emergency situations and in other circumstances prescribed in the organization of the command for battle, perform such duties for the care of the sick and wounded as the commanding officer may direct.

He is responsible for preventing and controlling dental diseases and for supervising dental hygiene within the command. He also serves

as adviser to the commanding officer in dental matters.

His duties in dental affairs parallel the medical officer in medical matters. He collaborates with the medical officer, in the event of any adverse physical condition, may have discovered in the course of examination.

#### Assistants

Both the medical officer and the dental officer may be assigned such officer assistants as may be necessary for efficient functioning of the departments or divisions. Enlisted assistants, hospital and dental apprentices, hospital men, and dental technicians.



DENTAL CARE

The dental officer is assisted by enlisted dental technicians, the department head.

### AIR AND REPAIR DEPARTMENTS AND AIR GROUP

#### Air Department

Aircraft carriers and seaplane tenders have an air department. Ships that do not have such a department may have an aviation division, which is a part of the gunnery or deck department. This division head is called the senior aviator. The title of the head of the air department is air officer. The air department may be composed of air divisions, air groups, and aircraft squadrons.

The air officer is charged primarily with launching and landing operations. He is responsible for providing services for maintenance and repair of squadron aircraft. Air and airborne electronic equipment assigned to the air department must be maintained and repaired by his personnel. His operational maintenance duties extend to all aircraft handling equipment, such as elevators, cranes, pulleys, and arresting gear.

## AL ORIENTATION RESEARCH AND ITS EFFECT ON NAVAL WARFARE

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## CHAPTER 23

# RESEARCH AND ITS EFFECT ON NAVAL WARFARE

### INTRODUCTION

Secretary of the Navy James Forrestal, on the occasion of the establishment of the Office of Naval Research in August 1946 made the following statement: "Wars are fought primarily with weapons which are developed before the fighting begins. . . . If a nation is to be scientifically prepared, its preparedness must be worked out in peacetime."

The United States Navy today has among its personnel the world's largest aggregation of technical and research men (at the end of World War II, two out of every three men in the Navy were technicians). Furthermore, it is the largest engineering organization in the world; it is also the largest shipbuilding, repair, and mechanical activity, and the greatest user of power.

Such an organization obviously has had a long and continued interest in scientific research and development. In order to keep its lines open, the Navy has constantly kept abreast of progress in practically every field of science. Its equipment has consistently been renewed and otherwise improved, so that the Nation's security might be maintained.

Thus the growth of United States naval power has followed closely the progress of science, and new tactics have been made possible by progress in naval technology. At Manila in 1898, for example, Commodore Dewey did not depend on the eyes of his officers for locating the Spanish ships, aiming his guns, and communicating with the other vessels of his squadron. As late as World War I naval commanders had only meager optical equipment for the same work. The tremendous technological advances of World War II, however, have made

it possible to find and fire on the enemy even though his ships are far out of sight. Radar, sonar, and other highly complicated devices have changed completely the entire picture of naval warfare.

In this chapter are outlined briefly the stages of naval scientific and technological progress by which the United States Navy from the time of its establishment to the present has been enabled to attain and maintain its position as the leader of the navies of the world.

#### Historical Background, 1800-1900

The introduction of the steamship in the early decades of the 19th century was closely followed by the conversion of the United States Navy from sail to steam.

During the latter part of the 19th century the submarine was developed as a practical naval weapon, largely on the basis of the experimental work of American inventors. After years of development, the first successful submarine of the United States Navy was commissioned in 1900; the navies of other countries were also active in this new field of underwater operations.

During this same period the Navy established its first testing laboratories, to keep pace with civilian invention and the general progress of technology. These units were among the first well-organized laboratories of the country and reflected accurately the trend toward organized group effort in scientific research. The day of the solitary inventor, working independently in his shop and relying primarily on his own imagination and ingenuity, was rapidly passing. The United States Navy was among the first to realize that scientific and technical problems